

HP 3000 Computer System

MPE IV System Tables Reference Manual



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IMPORTANT NOTE

The information included in this manual is provided by Hewlett-Packard to describe the internal organization of MPE. It is not intended to be a guide to the modification of MPE.

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CHAPTER 1 MEMORY LAYOUT

FIXED LOW MEMORY (SERIES II/III)

ABSOLUTE MEM LOC	0	CSTB (BASE OF CST TABLE)	0	
	1	XCSTB	1	
	2	DSTB	2	
	3	PCBB	3	
	4	CPCB (CURRENT PCB POINTER)	4	
	5	QI (INITIAL Q FOR ICS)	5	
	6	ZI (INITIAL Z FOR ICS)	6	
	7	MASK WORD	7	
	10	RESERVED	8	RESERVED FOR > LOADER MAPPING FIRMWARE
	11	RESERVED	9	
	12	RESERVED	10	
	13	RESERVED	11	
	14	0		
	15	P-LABEL FOR INTERRUPT HNDLR		
	16	DB SET FOR INTERRUPT HNDLR		
	17	U INTERRUPT INTERVAL VALUE		

U: set if clock interface has been used since coldload

NOTE: ALL POINTERS ARE ABSOLUTE ADDRESSES.

FIXED LOW MEMORY (SERIES 30/33)

%		DEC
0	CSTB (BASE OF CST TABLE)**	0
1	XCSTB (BASE OF CSTX TABLE)**	1
2	DSTB (BASE OF DST TABLE)**	2
3	PCBB (BASE OF PCB TABLE)**	3
4	CPCB (CURRENT PCB POINTER)**	4
5	QI (INITIAL Q FOR ICS)**	5
6	ZI (INITIAL Z FOR ICS)**	6
7	SYSTEM INTERRUPT MASK WORD**	7
10	DBBANK (FOR INITIAL'S STACK)*	10
11	DB (FOR INITIAL'S STACK)*	9
12	CHANPROG (BUFF FOR DISC)*	10
13		11
14	SDTYPE (USED BY BOOTSTRAP-SYS DISC)*	12
15		13
16	SPEEDCODE (CODE FOR CONSOLE SPEED)*	14
17	TERMCHANPROG (BUFF FOR CONSOLE)*	15
20	TAPECHANPROG (BUFF FOR TAPE)*	16
21	LR (INTERRUPT INTERVAL)+	17
22	TEMPLR (TEMP STOREAGE OF LIMIT REG)+	18
23	PCLC (PROCESS CLOCK LAST COUNT)**	19
24	PCHI (PROCESS TIME - MSW)**	20

FIXED LOW MEMORY (SERIES 30/33) (CONT)

25	PCLO (PROCESS TIME - LSW)**	21
26	SCST (SYSTEM CLOCK STATUS)**	22
27	SCLC (SYSTEM CLOCK LAST COUNT)**	23
30		24
31-37	TEMP'CPVA (TEMPORARY CPVA)*	25-31

NOTE: ALL POINTERS ARE ABSOLUTE ADDRESSES.

LEGEND: ** NEEDED BY FIRMWARE AND/OR BY SYSTEM, ALWAYS
 * NEEDED DURING INITIAL
 + NEEDED BY MPE, SET UP BY INITIAL OR PROGENITOR.

FIXED LOW MEMORY (SERIES 44)

%		DEC
0	CSTB (BASE OF CST TABLE)**	0
1	XCSTB (BASE OF CSTX TABLE)**	1
2	DSTB (BASE OF DST TABLE)**	2
3	PCBB (BASE OF PCB TABLE)**	3
4	CPCB (CURRENT PCB POINTER)**	4
5	QI (INITIAL Q FOR ICS)**	5
6	ZI (INITIAL Z FOR ICS)**	6
7	SYSTEM INTERRUPT MASK WORD**	7
10	DBBANK (FOR INITIAL'S STACK)*	10
11	DB (FOR INITIAL'S STACK)*	9
12	CHANPROG (BUFF FOR DISC)*	10
13		11
14	SDTYPE (USED BY BOOTSTRAP-SYS DISC)*	12
15		13
16	SPEEDCODE (CODE FOR CONSOLE SPEED)*	14
17	TERMCHANPROG (BUFF FOR CONSOLE)*	15
20	TAPECHANPROG (BUFF FOR TAPE)*	16
21	LR (INTERRUPT INTERVAL)+	17
22	TEMPLR (TEMP STOREAGE OF LIMIT REG)+	18
23	LR (SYSTEM CLOCK LIMIT REGISTER)	19
24	////////////////////////////////////	20

FIXED LOW MEMORY (SERIES 44) (CONT)

25	TR (TIME SINCE LAST SOFT TIMER INTERRUPT)	21
26	SCST (SYSTEM CLOCK STATUS)**	22
27	SCLC (SYSTEM CLOCK LAST COUNT)**	23
30		24
31-37	TEMP'CPVA (TEMPORARY CPVA)*	25-31

NOTE: ALL POINTERS ARE ABSOLUTE ADDRESSES.

LEGEND: ** NEEDED BY FIRMWARE AND/OR BY SYSTEM, ALWAYS
 * NEEDED DURING INITIAL
 + NEEDED BY MPE, SET UP BY INITIAL OR PROGENITOR.

SYSTEM GLOBAL AREA

octal		name
0	SYSGLOB - SYSBASE	
1	CST BASE - SYS BASE	SYSCST
2	DST BASE - SYS BASE	SYSDST
3	PCB BASE - SYS BASE	SYSPCB
4	ARSBM BASE - SYS BASE	SYRSARSBM
5	IOQ BASE - SYS BASE	SYRIOQ
6	SBUF BASE - SYS BASE	SYSBUF
7	ICS QI - SYS BASE	SYRICS
10	LPDT BASE - SYS BASE	SYSLPDT
11	STOPS BASE - SYS BASE	SYSBPT
12	TRL BASE - SYS BASE	SYSTRL
13	JCUT BASE - SYS BASE	SYSSIR
14	SIR BASE - SYS BASE	SYSSDCTAB
15	JPCNT BASE - SYS BASE	SYSJPCNT
16	TBUF BASE - SYS BASE	SYSBUF
17	MONBUF BASE - SYS BASE	SMONBUF
20	FIRST FREE MEMORY ADDRESS	
21		
22	TIME OF LAST CYCLE	
23		
24	RESERVED	
25	SWAPTAB BASE - SYSBASE	SYSSWAPTAB

26	VDSMTAB BASE- SYSBASE	VDSMTAB
27		
30	CURRENT CST BLOCK INDEX	CSTBX
31	DISCREQTAB BASE - SYS BASE	SYSDISCREQTAB
32	DISPLACEMENT TO CODE =@CST(0)-@DST(0)	DFC
33	DISPLACEMENT TO SHARABLE = @CST(LAST)-@DST(0)	DFS
34	Global Class Enable Mask	GCLASSENMASKP
35	ABS ADDRESS (SYSDIT(8))	SYSDIT8
36	Statistics Gathering XDS Bank	STATGATHXDSBANK
37	Statistics Gathering XDS base	STATGATHXDSBASE
40	RESERVED FOR INITIAL (VDSEENTRY)	
41	RESERVED FOR INITIAL (VDSMAP)	
42	SRTTAB BASE - SYS BASE	SRTTAB
43	SPECQ HEAD - SYS BASE	SYSSPECQHEAD
44	ARL BASE - SYS BASE	SY SARLD
45	# PAGES IN LARGEST CURRENTLY AVAILABLE REGION	SYSMAXAVAILREG
46	MAKE OVERLAY CANDIDATE INFORMATION	MOCINFO
47	NUMBER OF MEMORY BANKS CONFIGURED -1	SYSNBANKS
50	SCHEDULER TO AWAKE MESSAGE	SCHEDTOAWAKEMSG
51	POINTER TO CSTBLK TABLE	CSTXBLOCKPOINTER
52	AWAKE TO SCHEDULER MESSAGE	AWAKETOSCHEDMSG
53	WAIT TO SCHEDULER MESSAGE	
54	CURRENT ACTIVITY'S PRIORITY	CURACTPRI

SYSTEM GLOBAL AREA (cont)

octal		name
/55	BUSY TABLE POINTER	BUSY
56	HEAD TABLE POINTER	HEAD
57	TAIL TABLE POINTER	TAIL
60	# OF SIO PROGRAMS EXECUTING	SIOCOUNT
61	PARITY ERROR FLAG (MEM PE)	PARITY
62	Impeded queue head for message buffer (PIN)	IOMSGPIN
63	I/O Message system error flags (0:1) - No SYSBUF avail for I/O error logging (1:1) - No SYSBUF for IOMESSAGE (GENMSG)	IOLOGQX
reserved for I/O < system	64	# OF TERMINALS READING
	65	# OF TERMINALS WRITING
	66	DSET B
	67	LAST TIMER
	70	HIGHEST DRT NUMBER
	71	POWERFAIL
	72	SYSTEM UP FLAG
	73	SYS CONSOLE LOGICAL DEVICE NUMBER
	74	COLD LOAD COUNT
	75	SHARED FCB DST
	76	MONITORING FLAGS
reserved for file < system	100	MAX # OF SPOOL SECTORS
	101	

102	CURRENT # OF SPOOL KILOSECTORS	NUMSSECT
103		
104	# SECTOR/SPOOFLE EXTENT	EXTSSECT
105	MAX CODE SEGMENT SIZE	
106	MAX # OF CODE SEGMENTS/PROCESS	
107	MAX STACK SIZE (MAXDATA)	
110	DEFAULT STACK SIZE	
111	MAX EXTRA DATA SEGMENT SIZE	
112	MAX # EXTRA DATA SEGMENTS/PROCESS	
113	DST number for MESSAGE buffers	
114	UPDATE LEVEL	UPDATEL
115	FIX LEVEL	FIXL
116	VERSION LEVEL	VERSION
117	DEFAULT CPU TIME LIMIT	
120	# OF SECONDS TO LOGON	
121	JOBSYNCH BITS (13:3)	
122	EXTERNAL PLABEL OF INITIATE	
123	INTERNAL PLABEL OF INITIATE	
124	MAXSYSDST	
125	MAXSYSCST	
126	SL.PUB.SYS LDEV SL.PUB.SYS	
127	DISC ADDRESS	
130	(DIRECTORY)	
131	(DISC ADDRESS)	

SYSTEM GLOBAL AREA (cont)

octal		name
-----		-----
132	SPOOLINDEX	
/133	EXT LABEL FOR SHOWCOM	
134		
135	CS IOWAIT PLABEL	
reserved< for CS	136	CS FIX LEVEL
	137	CS VERSION
	140	CCLOSE PLABEL
	141	LOGICAL PROCESS TABLE (PROGEN) 0
	142	////////////////////////////////////
	143	LOGICAL PROCESS TABLE (UCOP) 2
	144	LOGICAL PROCESS TABLE (PFAIL) 3
	145	LOGICAL PROCESS TABLE (DEVREC) 4
	146	LOGICAL PROCESS TABLE (DRUSG) 5
	147	LOGICAL PROCESS TABLE (STMSG) 6
	150	LOGICAL PROCESS TABLE (LOG) 7
	151	LOGICAL PROCESS TABLE (LOAD) 8
	152	LOGICAL PROCESS TABLE (IOMESSPROC) 9
	153	LOGICAL PROCESS TABLE SYSIOPRDC 10

154	LOGICAL PROCESS TABLE MEMLOGP	11
155	EXTERNAL PLABEL OF "TERMINATE"	
156	INTERNAL PLABEL OF "TERMINATE"	
157	EXTERNAL PLABEL OF "COMMANDINTERP"	
160	INTERNAL PLABEL OF "COMMANDINTERP"	
161	EXTERNAL PLABEL OF "SPOOLIN"	
162	INTERNAL PLABEL OF "TRACE0"	
163	EXTERNAL PLABEL OF "TRACE0"	
164	INTERNAL PLABEL OF "SPOOLIN"	
165	EXTERNAL PLABEL OF "SPOOLOUT"	
166	INTERNAL PLABEL OF "SPOOLOUT"	
167	3 WORD	
170	LOGGING	
171	MASK	
172	////////// STATE DST# - BUFFER 0	STATE:
173	////////// STATE DST# - BUFFER 1	0 EMPTY
174	BUFFER LENGTH (SECTORS)	1 CUR
175	FREE AREA POINTER	2. FULL
176	FLAGX	
177	# RECORDS WRITTEN IN BUFFER 0	
200	# RECORDS WRITTEN IN BUFFER 1	
201	FILE SIZE (BLOCKS) - 1ST HALF	
202	FILE SIZE (BLOCKS) - 2ND HALF	
203	(LOG FILE SIZE)	
204	(BLOCKS)	
205	LOG FILE NUMBER (LOGFILENUM)	

reserved
for
logging

206	NUMBER OF LOGGING [BLOCKS WRITTEN (1ST HALF)]
207	BLOCKS WRITTEN [BLOCKS WRITTEN (2ND HALF)]

SYSTEM GLOBAL AREA (cont)

octal		name
210	(TOTAL # LOG RECORDS MISSED)	
211	(DUE TO LOG FAILURE)	
212	TOTAL# RECORDS MISSED - "JOB INITIATION" LOSS	
logging 213	TOTAL# RECORDS MISSED - "JOB TERMINATION" LOSS	
214	OPERATOR CONSOLE JOBSSESSION # AT STARTUP	
215	GLOBAL	
216	ALLOW	
217	MASK	
220		

LOADER MESSAGE TABLE

RTM	250	F	ACTIVE RTM COUNT	BANK	RTMFLAG
	251		ADDRESS OF RTM XDS		RTMADDR
	252	E T ERR	XDS BANK NUMBER		XDSBANK
	253		EXTRA DATA SEGMENT ADDRESS		XDSADDR

segment trace	254	CURRENT WORD COUNT	XDSCOUNT
	255	BUFFER SIZE	BUFSIZE
	256	MAG TAPE LDEV	LDEV
	257	TRACE SEGMENT EXTERNAL LABEL	TLABEL
	260	STMON	
	261	MEASINFOTABPTR	
	262	MEASUREMENT STATISTICS CLASS MASK	GCLASSENABLEDMASK
	263	CLASS 0 STATISTICS BANK NUMBER	MEASSTATXDSBANK
	264	CLASS 0 STATISTICS ADDRESS	MEASSTSTXDSBASE
	265	SCAN POINT	
	266		
	267	MEASFLAGS	**
	270		
misc	271	Sysbase index of PCB at head of Dispatching Q	SYSDISQHEAD
	272	Sysbase index of PCB at tail of Dispatching Q	SYSDISPQTAIL
	273	RESERVED JB	
	274	RESERVED JB	
	275	RESERVED JB	
	276	HELP LOGICAL DEVICE NUMBER	
	277	CURRENT LOGON DST	DSTLOGON
	300	(STOP)	
	301	(BITS) (see p. 1-24)	
	302	# PROCESS ENTRIES	
	303		

process stop table	304	DEVREC PIN		2	
	305	%20			
	306	UCOP PIN		0	
	307	%20			
	310	LOG PIN		1	
	311	%20			
	312	IOMESS PIN		3	
	313	%20			
	314	MEMLOGP PIN		4	
	315	%20			
	316				
	317				
	320	DSGLOBAL DATA SEGMENT DST NUMBER			
	321	RESERVED FOR DS/3000 (SET TO ZERO)			
	322	RESERVED FOR DS/3000 (SET TO ZERO)			
	323	SDSLDEV PLABEL			
DS	324	RESERVED FOR DS/3000 (SET TO ZERO)			
	325	RESERVED FOR DS/3000 (SET TO ZERO)			
	326	RESERVED FOR DS/3000 (SET TO ZERO)			
	327	RESERVED FOR DS/3000 (SET TO ZERO)			
	330	DISC STATUS			LAST
	331	LDEV		DISC	DISC SIO ERROR
	332	AONESS			
	333	MAXQUEUE			
	334	DEFAULTQUEUE			JOBPRI

335	DSCHECK PLABEL	
336	DSOPEN PLABEL	
337	DSCLOSE PLABEL	
340	MANAGWRITE CONV. PLABEL	
341	CONSDSLINE' PLABEL	
342	CXREMOTE PLABEL	
343	CXDSLIN PLABEL	
344	CXRFA PLABEL	
345	DSIMAGE PLABEL	
346	DEFAULT LABEL TYPE TAPE LBL AUTO REC FUN	
347	SYSDB PTR TO TERM INIT CHNL PGM (S30/33 ONLY)	
350	Reserved	
351	LAST CYCLE DURATION	
352		
353	CYCLE THRESHOLD	
354		
355	BUG CATCH ENABLE CELL	
356	MONITOR BUFFER TIMESTAMP	MONBUFT0
357	MONITOR BUFFER TIMESTAMP	MONBUFT1
360	DSBREAK PLABEL	
361	Bank of last memory word	LAST MEMORY
362	Base of last memory word	ADDRESS
/363	PVPROC PIN	
364	PV RECOGNITION COUNT	
Private< Volumes	365	VMOUNT FLAGS AUTO ALL ON

366	
367	
370	
371	MSG CATALOG LDEV
372	MESSAGE CATALOG DISC ADDRESS
373	MSG DSTN
374	CONSMPLINE' PLABEL
375	CONSMRJE PLABEL
376	SYSTEM LEVEL UDC FLAG (1 = SYS UDC'S EXIST)
377	SYSDB RELATIVE POINTER TO SYSGLOB EXTENSION

SYSGLOB EXTENSION (%200 LONG; POINTER AT SYSDB+%377)

% 0	Swap Queue Delay (*100ms)	SWAPQDELAY
1	Bank of First Region in Linked Memory	FIRST
2	Base of First Region in Linked Memory	MEMORY
3	Garbage Collection Enable Flag	REGION
4	Move Threshold (in pages, for garb coll)	GARBCOLLENAB
5	Main Memory Page Size (in words)	MOVETHRESH
6	VDS PAGE SIZE	
7	LAST MAKE ROOM TIME	
8		
9	MEMORY PRESSURE DURATION THRESHOLD	

57	////////////////////////////////////	
60	PLABEL USERLOG (EXTERNAL)	
61	PLABEL USERLOG (INTERNAL)	
62	PLABEL RECLOG (EXTERNAL)	
63	PLABEL RECLOG (INTERNAL)	
64	PLABEL RESTART (EXTERNAL)	
65	PLABEL RESTART (INTERNAL)	
66		
67		
70	RESERVED FOR IMAGE	
71	RESERVED FOR MEASIO	12 MIOCNT *
72	LOADER CACHE SEGMENT NUMBER	
73	PLABEL 3270 (EXTERNAL)	
74	MIT UPDATE	
75	MIT FIX	
76	MIT VERSION	
77	COUNT OF TAPE CONTROLLERS USING MEASIO	
100	PORT DATA SEGMENT NUMBER	
101	RESERVED FOR SECOND PORT DATA SEGMENT	

* MIOCNT = MEASIOCOUNT (3 BITS)
 ** MEASFLAGS (15:1) = 1 ==> MONITOR ENABLED
 (14:1) = 1 ==> BUFFER FLIP/FLOP
 (13:1) = 1 ==> EOT ON MONITOR TAPE

SYSDB WORDS

ADDRESS	NAME	FUNCTION
DB+55	BUSY	- SYSDB relative pointer to BUSY TABLE for I/O resources
DB+56	HEAD	- SYSDB relative pointer to table containing head pointers to I/O resource queues
DB+57	TAIL	- SYSDB relative pointer to table containing head pointers to tail of I/O resource queues
DB+60	SIO COUNT	- Number of I/O Programs currently executing
DB+72	POWER FAIL	- 0-no power fail 1-system disc recovery 2-all other disc recovery 3-all other device recovery
DB+73	SYSUP	- System is up and operable
DB+74	CONSLDEVN	- System console logical device number

JOBSYNCH job synchronization via jobsynch (sysglob+121(8))

(13:1) - JOBSREADY - set by DEVREC & MORGUE (via procedure STARTDEVICE) indicating a ready job. This prevents UCOP from going to a wait state when a job is just made ready.

(15:1) - DEVFREED - set by DEALLOCATE when device count goes to 0.

NOTE - Both bits above used for synchronization of job-made-ready or devicefreed when UCOP is running.

(14:1) - JOBSWAITING- set by UCOP just before waiting if any job is waiting for list device. Signals DEALLOCATE to awake UCOP when a device is freed.

ALLOW MASK FORMAT

	BIT	COMMAND
	---	-----
WORD 1	0	ABORTIO
	1	ACCEPT
	2	DOWN
	3	GIVE
	4	HEADOFF
	5	HEADON
	6	REFUSE
	7	REPLY
	8	STARTSPOOL
	9	TAKE
	10	UP
	11	MPLINE
	12	DSCONTROL
	13	ABORTJOB
	14	ALLOW
	15	ALTSPoolFILE
WORD 2	0	ALTJOB
	1	BREAKJOB
	2	DELETESPOOLFILE
	3	DISALLOW
	4	JOBFENCE
	5	LIMIT
	6	STOPSPool
	7	SUSPENDSPool
	8	OUTFENCE
	9	RECALL
	10	RESUMEJOB
	11	RESUMESPOOL
	12	STREAMS
	13	CONSOLE
	14	WARN
	15	WELCOME

WORD 3	0	MON
	1	MOFF
	2	VMOUNT
	3	LMOUNT
	4	LDISMOUNT
	5	MRJECONTROL
	6	JOBSECURITY
	7	DOWNLOAD
	8	MIOENABLE
	9	MIODISABLE
	10	LOG
	11	FOREIGN
	12	IMLCONTROL
	13	SHOWCOM

LOGGING RELATED LOCATIONS

SYSDB

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
172	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
or	//////////				STATE				DST #							
173	-----															

STATE = 0 if respective buffer empty
 1 if respective buffer is current
 2 if respective buffer is full

FLAGX

SYSDB

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
176	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	////////////////////////////////////											SF	HF	BUF	SL	SD

SF = 1 if soft failure
 HF = 1 if hard failure
 BUF = 0 if current log buffer is buffer 0
 = 1 if current log buffer is buffer 1
 SL = 1 to indicate a switch in log buffers (from 0 to 1 or from 1 to 0)
 SD = 1 to indicate shutdown in progress

OPT AND SEGMENT TRACE CELLS

SYSDB

RTMFLAG* 250.(0:1) F: set if RTM enabled
 .(1:11) : # of active RTM processes
 .(12:4) : bank # of RTM xds

RTMADDR* 251

XDSBANK 252.(0:1) E: set if segment tracing enabled
 .(1:1) T: buffer toggle
 .(2:2) ERR: error code for MEASIO
 0 = no error
 1 = unrecoverable error
 2 = EOT - end of tape

PROCESS STOP LIST GENERAL LAYOUT

SYSDB

300	STOP BITS REPRESENTING WHICH PROCESSES TO STOP ON "SHUTDOWN"
	# PROCESS ENTRIES
	////////////////////////////////////
	1ST PROCESS ENTRY
	2ND PROCESS ENTRY
	.
	.
	.
	.
317	LAST PROCESS ENTRY

ENTRY FORMAT

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PROCESS PIN #								STOP BIT #							
PROCESS WAIT STATE															

PREASSIGNED ENTRIES

entry #	process	stop bit #
1	devrec	2
2	ucop	0
3	log	1

Initial Memory Allocation

This section is a description of the method used by INITIAL to allocate memory for MPE tables and code segments in MPE IV. All memory allocated by INITIAL is permanently allocated. All non-core resident code and data is put on disc before exiting INITIAL.

At the most basic level INITIAL will try to build memory to look exactly as diagrammed below. There are, however, several ways in which to deviate from this structure. Before going into the sources of these deviations, it is necessary to point out which portions of memory are used by INITIAL during the restart and therefore cannot be used by MPE until INITIAL has finished. Before INITIAL begins to allocate any memory space, it relocates its core resident code, its code segment swapping area and its stack to the highest configured memory space. Additionally, it uses the last %240 words of bank 0 on a series III and the last %326 words of bank 0 on series 30, 33 and 44 for its I/O buffer area and temporary code segment table. After INITIAL has built all of core resident MPE (tables and code), it builds the disc resident MPE tables. Since some of the disc resident tables may be too large to be built in INITIAL's stack, these tables are built in unused memory space. Therefore, in addition to the memory space required for INITIAL's code, INITIAL's stack and core resident MPE, there must be enough space left in which to build the largest of the disc resident tables.

INITIAL will essentially build memory in the order shown below, however, there may be an unused fragment of memory between the DRT's and the system global area which INITIAL will fill with the smaller tables. Neither the tables marked with an asterisk nor the code segments will ever be put in this area.

Beginning with the B MIT, all bank 0 dependencies have been removed from core resident MPE code. If there is insufficient space in bank 0 for any core resident code segment, INITIAL will put it into bank 1. At the present time core resident MPE is not large enough to occupy more than all of bank 0 and part of bank 1. If the system being built by INITIAL is configured with 128K words or 160K words of memory then INITIAL's stack will be in bank 1 (the code also on a 128K word memory size). If INITIAL is occupying part of bank 1 and the space is needed for a core resident MPE code segment or to build a disc resident table then INITIAL will print the error message "ERROR #350 OUT OF MEMORY".

Except for the exceptions stated above, for every allocation of memory INITIAL will first try to allocate any remaining space between the DRT's and SYSDB. It will then try the next available space in bank 0, then the next available space in bank 1. If it were necessary it could continue searching until all all banks were checked for available space.

Immediately before exiting INITIAL, INITIAL lays down all the memory region headers and trailers as shown below. For any one bank of memory there will only be one block of core resident MPE, regardless of its contents. The only block of core resident MPE that does not have a reserved region global header is in bank 0. It does have the reserved region global trailer though. Before placing any code outside bank 0 the first %23 words of every bank (except bank 0) is reserved for the region global header.

////////// BANK 0 //////////
Low Core memory
DRT
System Global area
Firmware area
SYSGLOB Extension
TBUF's
*DIT's
DST
CST
CSTX
PCB
ICS
*IOQ
Disc Request Table
ILT/DLT
I/O resource Table
*System Buffers
Swap Table
CST Block Table
Special Request Table
Message Harbor Table
Primary Message Table
Measurement Information Table
VDSMTAB

ARSMB Table
Available Region List
LPDT
Timer Request Queue
Job Process Count
Job Cutoff Table
Sir Table
Memory Management Monitor Buffer
Core Resident CST's in CST order
Reserved Region Global Trailer
Available Region Global Header
Available Memory
Available Region Global Trailer
////////// BANK 1 //////////
Reserved Region Global Header

Core Resident CST's that didn't
fit in BANK 0

Reserved Region Global Trailer

Available Region Global Header

Available Memory

Available Region Global Trailer

////////// BANK BOUNDRY //////////

Available Region Global Header

Available Memory

Available Region Global Trailer

////////// BANK BOUNDRY //////////

ETC.

2.1 Segment Table Structure

The current location and state of each data segment and loaded code is maintained in the segment table. This table is partitioned into parts, as shown in Figure 2-1. The partitions are based on the seg classes: a segment is a data segment, a segment is a system s1 seg segment is part of a program. The structure and format of each par is described in the following.

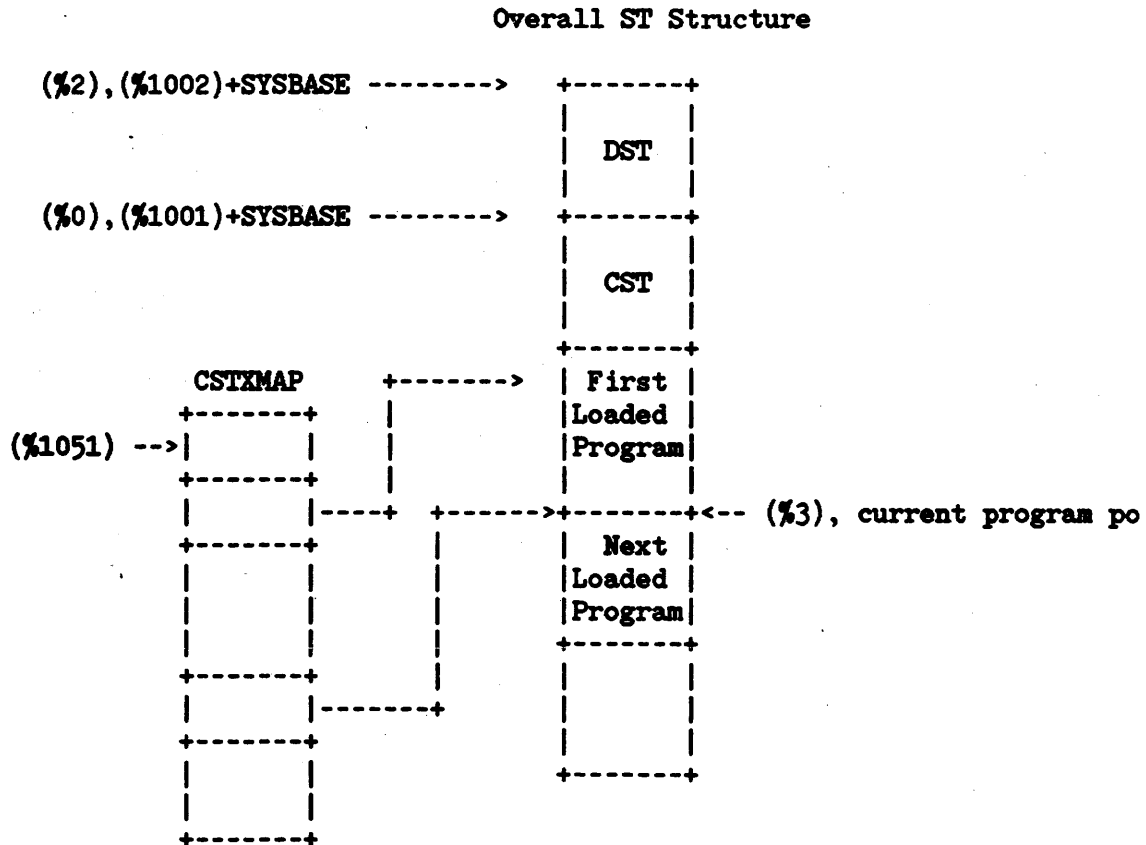


Figure 2-1

2.1.1 Pointers and DST #'s of Segment Table Components

i. DST

% 2 absolute address of entry 0 of the DST
%1002 sysbase relative index of entry 0 of DST
DST# =2

ii. CST

% 0 absolute address of entry 0 of system s1
%1001 sysbase relative index of entry 0 of system s1
%1032 displacement from DST base of entry 0 of system s1
= @ CST - @ DST =DPC
DST# =1

iii. CSTX

% 0 absolute address of entry 0 of current program
%1033 displacement from DST base to first CSTX entry s1
= @ CST (LAST) - @ DST (0) = DFS
DST# =4

iv. CSTXMAP

%1051 sysbase relative index of entry 0 of CSTXMAP
DST# =43 (%71)

STANDARD SEGMENT IDENTIFIER FORMAT

I. SEGMENT IDENTIFIER FORMAT

SEGIDENTIFIER.(0:1) = 1 ==> SEG IS PART OF A PROGRAM
 ==> (1:7) = PROGRAM INDEX INTO CSTXBLK,
 (8:8) = LOGICAL SEG NUMBER (0-255)
 SEGIDENTIFIER.(0:2) = 0 ==> SEG IS A DATA SEGMENT,
 (2:14) = DST ENTRY NUMBER
 SEGIDENTIFIER.(0:2) = 1 ==> SEG IS AN SL SEGMENT,
 (2:14) = SL ENTRY NUMBER
 EQUATE SEGIDDATATYPE=0,

2.1.3 DST Entry Formats

DST Entry 0 Format

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Word 0	# OF CONFIGURED ENTRIES															
Word 1	ENTRY LENGTH															
Word 2	# OF AVAILABLE ENTRIES															
Word 3	TABLE RELATIVE INDEX TO FIRST FREE ENTRY															

DST General Entry Format

Case (i) DST Entry for a Present Data Segment

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
Word 0	A	0	R														FIRMINFO	
Word 1	D	R	I	S	M	F	S	C	W								VMALLOC	FLAGS
	C	O	M	T	O	W	Y	O	D									
	V	C	I	K	D	I	S	R										
						P	E											
Word 2																	BANK	MMBANK
Word 3																	BASE	MMBASE

Case (ii) DST Entry for an Absent Data Segment

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Word 0	A	0	R														FIRMINFO
Word 1	D	R	I	S	M	F	S	C	W								VMALLOC
	C	O	M	T	O	W	Y	O	D								FLAGS
	V	C	I	K	D	I	S	R									
						P	E										
Word 2			L	DEV #													HODA
Word 3																	LODA

2.1.6 CST Entry Formats

CST General Entry Format

Case (i) CST Entry for a Present SL Segment or CSTX Segment

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Word 0	A	M	R	T	SIZE/4												FIRMINFO
Word 1	/	R	I	/	/	/	S	C	////////////////////////////////								FLAGS
	/	O	M	/	/	/	Y	O	////////////////////////////////								
	/	C	I	/	/	/	S	R	////////////////////////////////								
	/			/	/	/	E	////////////////////////////////									
Word 2	BANK												MMBANK				
Word 3	BASE												MMBASE				

Case (ii) CST Entry for an Absent Segment SL or CSTX Segment

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Word 0	A	M	R	T	SIZE/4												FIRMINFO
Word 1	/	R	I	/	/	/	S	C	////////////////////////////////								FLAGS
	/	O	M	/	/	/	Y	O	////////////////////////////////								
	/	C	I	/	/	/	S	R	////////////////////////////////								
	/			/	/	/	E	////////////////////////////////									
Word 2	L DEV #							HODA								HODA	
Word 3	LODA															LODA	

2.1.7 ST Entry Field Descriptions

A = 1 ==> segment absent
 M = 1 ==> segment privileged
 R = 1 ==> segment has been referenced
 T = 1 ==> segment is being traced
 DCV = 1 ==> disc copy is valid
 STK = 1 ==> segment is a stack
 MOD = 1 ==> a segment modification (exp., contr.) is pending
 FWIP = 1 ==> a forced write of this segment is in progress
 VMPAGECNT = # of virtual memory pages allocated to this segment
 ROC = 1 ==> segment is recoverable overlay candidate
 IMI = 1 ==> segment is in motion in
 SYS = 1 ==> segment is a system segment
 CORE = 1 ==> segment is core resident
 WD = 1 ==> write disabled

TABLE FORMAT-CSTBLK

CSTBLK(0)	-----	
0		*
*	NUMBER OF ENTRIES IN TABLE	*

1		*
*	ANY UNASSIGNED ENTRY = -1	*

2		*
*	ANY ASSIGNED ENTRY > 0	*

*		*
*	REMAINING CSTBLK TABLE ENTRIES	*
*		*

COMMENTS-

The table is initialized to minus one in each entry. When selected, the entry is replaced by a DST-relative index into the CST extension block.

2.1.8 Program Blocks and the CSTXMAP

Since programs can be dynamically loaded and unloaded, the segment table kept packed or fragmentation would occur. Thus, the block of ST entries program segment begins at an ST entry number that changes if a program w loaded before it gets unloaded. To manage this dynamic structure, an au structure, the CSTXMAP is used. A program is identified by its index, C into this map. The program's current beginning physical ST entry number equal to CSTXMAP (CSTXEIX).

ENTRY FORMAT-CST EXTENSION BLOCK

```
CSTXMAP(CSTXEIX)-->-----
      0 * M = # OF CST'S IN BLOCK *
      -----
      1 * VALIDITY=%125252 *
      -----
      2 * # OF USERS SHARING BLOCK *
      -----
      3 *          0          *
      -----
%301 -----> * HAS CST ENTRY FORMAT *
      -----
%302 -----> * HAS CST ENTRY FORMAT *
      -----
      .
      .
      .
%300+M -----> * HAS CST ENTRY FORMAT *
      -----
```

COMMENT

The value of CSTXEIX is established when a CST extension block is allocated. This index into the array CSTXMAP is maintained in the PCB of each process sharing the block.

2.1.9 Fixed DST Entry Assignments

OCTAL		DECIMAL	TABLE NAME
0		0	
1	CST	1	CST
2	DST	2	DST
3	PCB	3	PCB
4	CSTX	4	CSTX
5	SYSTEM GLOBAL AREA	5	SYS
6	CORE	6	CORE
7	ICS	7	ICS
10	SYSTEM BUFFERS	8	SBUF
11	UCOP REQUEST QUEUE	9	UCRQ
12	PROCESS-PROCESS COMMUNICATION TABLE	10	PPCOM
13	I/O QUEUE	11	IOQ
14	TERMINAL BUFFERS	12	TBUF
15	LOGICAL-PHYSICAL DEVICE TABLE	13	LPDT
16	LOGICAL DEVICE AND CLASS TABLE	14	LDT
17	DRIVER LINKAGE TABLE	15	DLT
20	I/O RESOURCE TABLES	16	BUSY, HEAD, TAIL
21	DISC FREE SPACE	17	
22	LOADER SEGMENT TABLE	18	LST
23	TIMER REQUEST LIST	19	TRL
24	DIRECTORY	20	DDS

DST ALLOCATION (CONT.)

25	DIRECTORY SPACE	21	
26	RIN TABLE	22	RIN
27	SWAPTABLE	23	SWAPTAB
30	JOB PROCESS COUNT	24	JPCNT
31	JOB MASTER TABLE	25	JMAT
32	TAPE LABEL TABLE	26	VDD
33	LOG TABLE	27	LOGTAB
34	REPLY INFORMATION TABLE	28	RIT
35	VOLUME TABLE	29	VTAB
36	BREAKPOINT TABLE	30	STOP
37	LOG BUFFER1	31	
40	LOG BUFFER2	32	
41	LOG ID TABLE	33	LIDTAB
42	ASSOCIATE TABLE	34	
43	CST BLOCK	35	CSTBLK
44	JOB CUTOFF TABLE	36	JCUT
45	SYSTEM JIT	37	SJIT
46	SPECIAL REQ TABLE	38	SRTTAB
47	VIRTUAL DISC SPACE MANAGEMENT TABLE	39	VDSMTAB
50	////////////////////	40	
51	ARSBM TABLE	41	ARSBMTAB
52	ILT	42	ILT
53	SIR TABLE	43	SIR

DST ALLOCATION (CONT.)

54	FMAVT	44	FMAVT
55	INPUT DEVICE DIRECT	45	IDD
56	OUTPUT DEVICE DIRECT	46	ODD
57	WELCOME MESSAGE #1	47	LOGONDSTN1
60	WELCOME MESSAGE #2	48	LOGONDSTN2
61	CS DATA SEGMENT	49	CSTAB
62	PROCESS-JOB CROSS REFERENCE	50	PJXREF
63	SYSTEM JDT	51	SYSJDT
64	COMMAND LOGON DST	52	CILOGDST
65	MOUNTED VOL. SET TABLE	53	MVTAB
66	PRI.VOL. USER TABLE	54	PVUSER
67	AVAILABLE REGION LIST	55	ARLDTAB
70	DISC REQUEST TABLE	56	DISCREQTAB
71	MSG HARBOR TABLE	57	MSGHARBTAB
72	PRIMARY MESSAGE TABLE	58	PRIMMSGTAB
73	MEASUREMENT INFO TABLE	59	MEASINFOTAB
74	RESERVED	60	SECMSGTAB
75	FIRST FREE DST	61	

2.2 Swap Tables

2.2.1 SWAPTAB

The Swaptab is a core resident memory management table used to keep track of the locality lists of the competing processes.

SWAPTAB DST# = 23 (%27)

%1025 Sysbase relative index of SWAPTAB entry 0.

SWAPTAB ENTRY 0 FORMAT

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SWAPTAB00	# ENTRIES CONFIGURED															
SWAPTAB01	ENTRY SIZE (5)															
SWAPTAB02	# FREE ENTRIES															
SWAPTAB03	TABLE RELATIVE INDEX OF FIRST FREE ENTRY															
SWAPTAB04	0															

SWAPTAB UNASSIGNED ENTRY FORMAT

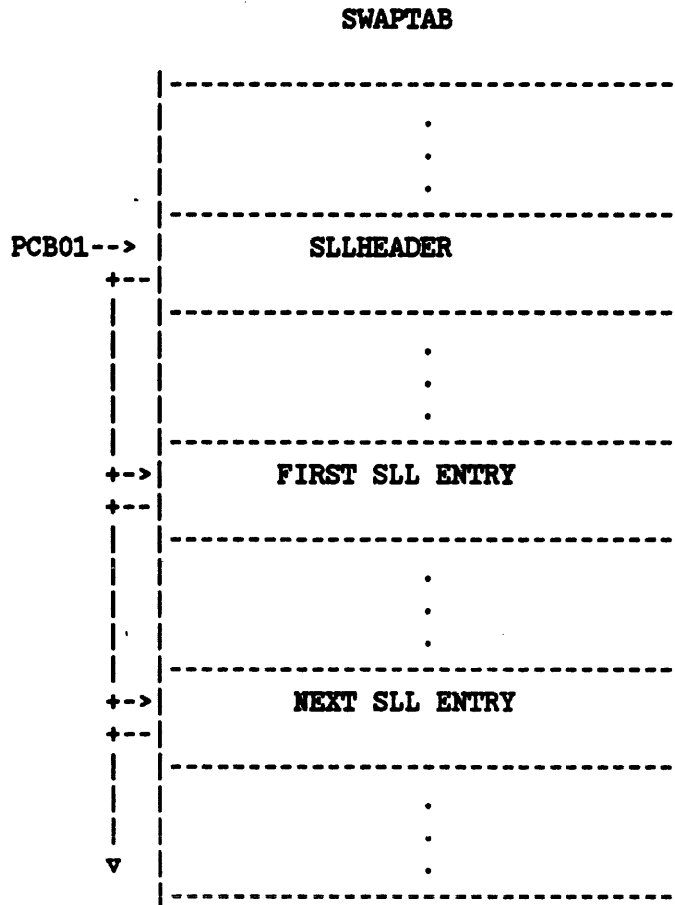
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SWAPTAB00	%100000															
SWAPTAB01	TABLE RELATIVE INDEX OF NEXT FREE ENTRY															
SWAPTAB02	0															
SWAPTAB03	0															
SWAPTAB04	0															

An assigned entry in the swaptab is a process' SLL header or a member of a process' SLL. These formats are now described.

2.2.2 Segment Locality Lists (SLL)

The system maintains for each process a segment locality list (SLL) the segments belonging to that process' current working set. The process' SLL consists of a header and a list of entries. The header and list entries are taken from the SWAPTAB.

A process' SLL is located via the process' pcbentry. PCB01 contains the sysbase relative index of the process' SLL header.



SLL HEADER FORMAT

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	S	S	H	I	P												
	W	W	A	N	A												
SLLHEAD00	I	R	S	T	R												SLLSCHEDTOIOMS
	P	E	M	L	T												
		Q	E	O	I												
			M	C	N												
SLLHEAD01	SYSBASE RELATIVE INDEX OF FIRST ENTRY IN LIST																SLLFIRSTINX
SLLHEAD02	WORD NOT CURRENTLY USED																
SLLHEAD03	SYSBASE RELATIVE INDEX OF MEMORY REQUEST ENTRY																SLLMEMREQINX
SLLHEAD04	# ENTRIES IN PROCESS' SLL																SLLCOUNT

SLLHEAD00 .(0:1) SWIP, Swap In Progress Flag
 .(1:1) SWREQ, Swap Required Flag
 .(2:1) HASMEM, Has Memory Flag
 .(3:1) PARTIN, Process partially swapped in
 .(4:4) Available
 .(8:8) IOCNT, Segment read completions until awake

SLL LIST ENTRY FORMAT

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
SLEENTRY00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	SLLMPQLINK
	PMPQPIN								NMPQPIN								
SLEENTRY01	SYSBASE RELATIVE INDEX OF NEXT ENTRY IN LIST																SLLNEXTINX
SLEENTRY02	SYSBASE RELATIVE INDEX OF PREV ENTRY IN LIST																SLLPREVINX
SLEENTRY03	SEGIDENTIFIER																SLLSEGIDENT
SLEENTRY04	/	S	/	/	/	/	/	T	F	L	S	D	/	/	/	/	SLLFLAGS
	/	T	/	/	/	/	/	O	Z	K	L	I	/	/	/	/	
	/	K	/	/	/	/	/	S	R	R	L	S	/	/	/	/	
	/		/	/	/	/	/	S	E	E	I	C	/	/	/	/	
	/		/	/	/	/	/		Q	Q	M	I	/	/	/	/	
	/		/	/	/	/	/				I	O	/	/	/	/	

```

SLENTTRY00 .(0:8) PMPQPIN, previous make present deferred queue pin
              .(8:8) NMPQPIN, next make present deferred queue pin

```

```

SLEENTRY01 .(0:16) SYSBASE, relative index of next entry in list (=0=> 1
entry)

```

SLEENTRY02 .(0:16) SYSBASE relative index of previous entry in list
(=0==> first entry)

SLEENTRY03 Has standard segment identifier format.

```
SLENTRY04 .(1:1) STK ==> process' stack entry
          .(7:1) TOSS ==> Toss this entry
          .(8:1) FRZREQ ==> Process requests a freeze on seg
          .(9:1) LKREQ ==> Process requests a lock on seg
          .(10:1) SLLIMI ==> process is queued for this segment
          .(11:1) DISIOSEG ==> process waiting for disc i/o against thi
                        seg
```


SPECIAL REQUEST TABLE

(USED FOR PASSING DATA SEGMENT SIZE CHANGE INFO AND FOR KEEPING
A LIST OF DEVICES WAITING FOR A SEGMENT TO ARRIVE IN MEMORY.)

ENTRY 0	0	# entries in table
	1	entry size (5)
	2	# available entries
	3	first available entry
	4	last available entry
=====		
first----> assigned entry (pointed to by %1043)	0	next assigned entry
	1	segidentifier
	2	new data seg size
	3	read displacement
	4	move count
=====		

2.3 Main Memory Region Headers and Trailers

Main memory is partitioned into regions. Each region is in one of three states: available, reserved, or assigned.

An available region is available for consumption by the free space allocation mechanism. An available region consists of neighboring subregions, each which is either a hole or an overlay candidate. An available region is linked into the available region list of appropriate size.

A reserved region is a main memory region which is in the transition state from available to assigned. A reserved region has been cleaned, and there is a pending disc read of a segment into the region.

Assigned regions are occupied by present segments. Available and reserved regions consist of one or more adjacent subregions. Region headers and trailers are partitioned into global and local components. The global region header/trailer is only valid for the first/last subregion in regions consisting of more than one subregion.

The region headers and trailers of available, reserved, and assigned regions contain the state and control information pertaining to the current or planned contents of the region.

2.3.1 Available Region Headers and Trailers

Available Region Global Header Format
(only valid for first subregion)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
RB-19	A	R	A	C	R	R	R	R	///	///	///	///	///	///	///	R	RAS
	S	E	V	L	E	E	E	E	///	///	///	///	///	///	///	E	
	S	S		N	S	S	S	S	///	///	///	///	///	///	///	S	
				D					///	///	///	///	///	///	///		
RB-18	REGION SIZE (IN MAIN MEMORY PAGES)																RS
RB-17	RESERVED																
RB-16	RESERVED																
RB-15	REGION BASE OF PREVIOUS IN THIS AVAILABLE																PLINK
RB-14	REGION LIST																
RB-13	REGION BASE OF NEXT IN THIS AVAILABLE																NLINK
RB-12	REGION LIST																
RB-11	RESERVED																

Available Region Subregion Header
(Valid for All Subregions)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
RB-10	SUBREGION SIZE (IN MAIN MEMORY PAGES)																SS
RB-9	V SUBREGION DISPLACEMENT (IN MAIN MEM PAGES)																SD
RB-8	WRITE REQUEST POINTER																WREQP
RB-7	SEGMENT IDENTIFIER																SEGIDET
RB-6	RESERVED																
RB-5	RESERVED																
RB-4	LDEV #								HODA							HODA	
RB-3	LOW ORDER DISC ADDRESS																LODA
RB-2	////////////////////////////////////																
RB-1	////////////////////////////////////																

RB ===>

Available Region Subregion Trailer

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
////////////////////////////////////																

SUBREGION SIZE																TSS

Available Region Global Trailer (Valid Only for Last Subregion)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A	R	A	////////////////////////////////////													TRAS
S	E	V	////////////////////////////////////													
S	S		////////////////////////////////////													

REGION SIZE																TRS

2.3.2 Reserved Region Headers and Trailers

Reserved Region Global Header Format (Only Valid for First Subregion)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	A	R	A	C	S	L	F	I	/	/	/	/	/	/	/	/	M
	S	E	V	L	C	K	Z	O	/	/	/	/	/	/	/	/	I
RB-19	S	S		N		D	N	F	/	/	/	/	/	/	/	/	P
				D				Z	/	/	/	/	/	/	/	/	
RB-18	REGION SIZE (IN MAIN MEMORY PAGES)																RS
RB-17	ON-GOING I/O COUNT																IOCNT
	M	E	O	Q	I	E	G	M	R	/	/	/	/	/	/	/	INITMSG
RB-16	S	X	N	S	N	X	A	S	E	/	/	/	/	/	/	/	
	G	T	G	E	C	P	R	G	L	/	/	/	/	/	/	/	
	P	D	I	G	M	R	B	A	R	/	/	/	/	/	/	/	V
	R	I	O	R	V	R	C	B	E	/	/	/	/	/	/	/	A
	O	S	D	E		E	O	O	S	/	/	/	/	/	/	/	L
	C		I	A		Q	L	R	P	/	/	/	/	/	/	/	I
			S				L	T	G	/	/	/	/	/	/	/	D
RB-15	INITIATION MESSAGE INFORMATION																INITINFO
	M	M	B	S	I	M	/	/	/	/	/	/	/	/	/	/	COMPMSG
	S	O	K	C	O	S	/	/	/	/	/	/	/	/	/	/	
RB-14	G	D	D	H	W	G	/	/	/	/	/	/	/	/	/	/	
	P	R	L	E	A	A	/	/	/	/	/	/	/	/	/	/	
	R	E	K	D	I	B	/	/	/	/	/	/	/	/	/	/	
	O	Q		M	T	O	/	/	/	/	/	/	/	/	/	/	
	C			S		R	/	/	/	/	/	/	/	/	/	/	
				G		T	/	/	/	/	/	/	/	/	/	/	
RB-13	PIN OF FIRST PROCESS								PIN OF LAST PROCESS								MPQLINK
RB-12	RELEASE PAGE COUNT																PAGECNT
RB-11	SPECIAL REQUEST TABLE POINTER																SPECREQTABPTR

Reserved Region Subregion Header
(Valid for all Subregions)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
RB-10	SUBREGION SIZE (IN MAIN MEMORY PAGES)																SS
RB-9	C																SD
	N																
	T																
	V	# PAGES THIS SUBREGION IS DISPLACED															
	A	FROM THE REGION BASE															
	L																
	I																
	D																
RB-8	WRITE REQUEST TO POINTER																WREQP
RB-7	SUBSEGMENT IDENTIFIER																SEGIDENT
RB-6	FREEZE COUNT								LOCK COUNT								LKFZCNTRS
RB-5	WRITE DISABLED COUNT								I/O FROZEN COUNT								WDIOFZCNT
RB-4	LDEV #								HIGH ORDER DA								HODA
RB-3	LOW ORDER DISC ADDRESS																LODA
RB-2	////////////////////////////////////																
RB-1	////////////////////////////////////																

RB ==> First Word of Segment

Reserved Region Subregion Trailer
(Valid for All Subregions)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	////////////////////////////////////																
	SUBREGION SIZE (IN MAIN MEMORY PAGES)																TSS

**Reserved Region Global Trailer
(Valid Only for Last Subregion)**

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A	R	A	/	/	/	/	/	/	/	/	/	/	/	/	/	
S	E	V	/	/	/	/	/	/	/	/	/	/	/	/	/	TRAS
S	S		/	/	/	/	/	/	/	/	/	/	/	/	/	

REGION SIZE (IN MAIN MEMORY PAGES)																TRS

2.3.3 Assigned Region Headers and trailers

Assigned Region Global Header Format

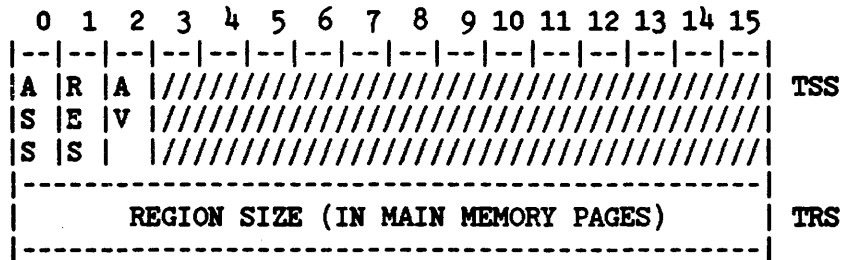
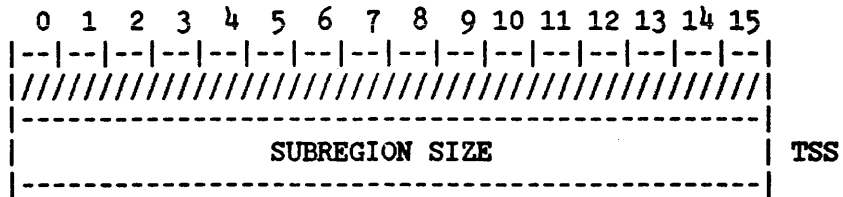
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RB-19	A	R	A	C	S	L	F	I	/	/	/	/	/	/	/	/	M	RAS
	S	E	V	L	C	K	Z	O	/	/	/	/	/	/	/	/	I	
	S	S		N		P	N	F	/	/	/	/	/	/	/	/	P	
				D				Z	/	/	/	/	/	/	/	/		
								N	/	/	/	/	/	/	/	/		
RB-18	REGION SIZE (IN MAIN MEMORY PAGES)																RS	
RB-17	RESERVED																	
RB-16	RESERVED																	
RB-15	RESERVED																	
RB-14	RESERVED																	
RB-13	RESERVED																	
RB-12	RESERVED																	
RB-11	RESERVED																	

Assigned Region Subregion Header

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
RB-10	SUB-REGION SIZE																SS
RB-9	RESERVED																
RB-8	RESERVED																
RB-7	SEGMENT IDENTIFIER																SEGIDENT
RB-6	FREEZE COUNT								LOCK COUNT								LKFZCNTRS
RB-5	WRITE DISABLED COUNT								I/O FROZEN COUNT								WDIOFZCNT
RB-4	LDEV#								HODA								HODA
RB-3	LOW ORDER DISC ADDRESS																
RB-2	////////////////////////////////////																
RB-1	////////////////////////////////////																

RB==>

Assigned Region Subregion Trailer Format



2.3.4 Region Header and Trailer Field Descriptions

RAS, Region Assignment State

- .(0:1) Region Assigned Flag
- .(1:1) Region Reserved Flag
- .(2:1) Region Available Flag
- .(3:1) Region Cleaned Flag
- .(4:1) Size Change Pending Flag
- .(5:1) Region Locked Flag
- .(6:1) Region Frozen Flag
- .(7:1) Region I/O Frozen Flag
- .(8:7) Available
- .(15:1) Blocked Lock Migration in Progress Flag

IOCNT, On-Going I/O Count

= # of on-going I/O's in the region which must complete befo

initiation message can be processed.

INITMSG, Initiation Message

- .(0:1) Message Processed Toggle Switch
- .(1:1) Message Externally Disabled Flag
- .(2:1) Message On-going I/O Disabled Flag
- .(3:1) Queue Segment Read Disc Request Flag
- .(4:1) Incore Move Request Flag
- .(5:1) Expansion Request Flag
- .(6:1) Garbage Collection Flag
- .(7:1) Message Aborted Flag
- .(8:1) Release Residual Pages Flag
- .(9:6) Available
- .(15:1) Message Valid Flag

INITINFO, Initiation Message Auxiliary Information

= Sysbase relative index of segment read disc request if INI
QREADREQ=1

or

= +/- Displacement to initiation message for moves and expan

COMPMSG, Completion Message

- .(0:1) Message Processed Toggle Switch
- .(1:1) Segment Modification Required
- .(2:1) Block Lock Request
- .(3:1) Send Scheduler A Message
- .(4:1) Awaken A Device
- .(5:1) Message Aborted
- .(6:2) Available

MPQLINK, Make Present Deferred Queue Link
 .(0:8) PIN Of First Process Waiting for this Segment
 .(8:8) PIN of Last Process Waiting for this Segment
PAGECNT, Release Page Count
 =# of extra pages to release before processing initiation
 message.
SPECREQTABPTR, points into special request table to the list of
 devices queried on this segment.
SS, Subregion Size
SD, Subregion Displacement
 .(0:1) Displacement Count Valid Flag
 .(1:15) # Pages to Base of Region
WREQP, Write Request Pointer
 = Sysbase Relative Index of Disc Write Request when the
 Data Segment in the Subregion is in Motion Out
SEGIDENT, Segment Identifier- has standard segment identifier format

Space Allocation Structures

Available regions in main memory are kept track of by multiple free
All available regions of the same size are linked into to the same
able region list (ARL). A bitmap is maintained to indicate which 1
non-empty (ARSBM). A sysglob cell is maintained which contains the
of the largest currently available region.

%1045 MAXAVAILREG, number of pages in largest currently available r

Available Region List (ARL)

%1044 SYSBASE index of base of ARL

ARL DST # = 55 (%67)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ARLD(0)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	0															
ARLD(1)	BANK OF FIRST AVAIL REGION OF SIZE = 1 PAGE															
	BASE OF FIRST AVAIL REGION OF SIZE = 1 PAGE															
ARLD(2)	BANK OF FIRST AVAIL REGION OF SIZE = 2 PAGES															
	BASE OF FIRST AVAIL REGION OF SIZE = 2 PAGES															
.																
.																
.																
ARLD(N)	BANK OF FIRST AVAIL REGION OF SIZE = N PAGES															
	BASE OF FIRST AVAIL REGION OF SIZE = N PAGES															

Where N = maximum available region size
= (2**16/2**pagepower) pages

.....

ARSBM(0)

ARSBM (M)

size J*16+K Pages is non-empty.

[illegible]

[illegible]

75 | 61

SYSTEM DISC LAYOUT (CONT.)

SYSDB

----->

%130/131

SYSTEM DIRECTORY

VIRTUAL MEMORY AREA

INITIAL PROGRAM SEGMENTS
(EXCEPT BOOTSTRAP SEG)

SYSTEM FILES
(FROM COLD LOAD TAPE)

SYSTEM TABLES
* LPDT
* LDT
* VOLUME TABLE
* DEVICE CLASS TABLE
INITIAL PROGRAM STACK

USER FILES

.
.
.

----> Note: Initial tries to allocate directly after the Free Space Table. However, this may vary depending on deleted or reassigned tracks

DISC LABEL (Sector 0 of disc)

SYSTEM VOLUME

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
0																	
0																	0
1																	1
2																	2
3																	3
4																	4
5																	5
6																	6
7																	7
10																	8
11																	9
12																	10
13																	11
14																	12
15																	13
16																	
.																	
.																	
.																	
.																	
24																	
25																	
26																	
27																	
.																	
.																	
.																	
.																	

DISC BOOTSTRAP
SIO PROGRAM
(SYSTEM DISC
ONLY)

Words 0-5 contain the
Ascii string
"SYSTEM DISC " for
/33, /44

ICF WCS
IMAGE
POINTER

122		
123	CYL	
124	HEAD	SECTOR

DISC LABEL SECTOR 0 (CONT.)

SERIAL VOLUME

0				0
1	0 (:STORE)			1
2	or			2
3	SIO PROGRAM (:SYSDUMP)			3
4	For /33, /44 Cold load channel			4
5	program is in sector 2, and memory dump			5
6	channel program is in sector 3.			6
7				7
10	0			8
11				9
12	"S"		"E"	10 \
13	"R"		"D"	11 VOL NAME
14	"I"		"S"	12 "SERDISC"
15	"C"		" "	13 /
16				
24	SERIAL DISC INFO			
25	CYL			14 ICF WCS
26	HEAD		SECTOR	15 IMAGE
27				15 POINTER
122	RESERVED FOR FUTURE WCS			
123	CYL			
124	HEAD		SECTOR	

DISC LABEL (cont)

SECTOR 0

MASTER VOLUME

	0		0
	1		1
	2	0	2
	3		3
	4		4
	5		5

SC = SCRATCH VOLUME	6 SC MV SR	6 TYPE 11 12 SUB-TYPE 15 6	

MV = MASTER VOLUME = 1	7	GENERATION INDEX	7

SR = SERIAL VOLUME	10	0	8
	11		9

	12		10
	13	VOLUME	11
	14	NAME	12
	15		13

	16	INITIAL DATE	14

	17	DIRBASE	15

	20	DIRSIZE	16

	21		17
	22	ACCOUNT	18
	23	NAME	19
	24		20

	25		21
	26	GROUP	22
	27	NAME	23
	30		24

0 IF NOT
MASTER
VOLUME

MASTER VOLUME (CONT.)

	31				25	
	32		VOLUME SET		26	
	33		NAME		27	HEADER
	34				28	
VS VTAB	35				29	
HEADER +						
8 ENTRIES	36		0 VCOUNT 3		30	
COPIED FROM						
VSET DEFN	37				31	
IN SYSTEM	40		VOLUME		32	
DIRECTORY	41		NAME		33	VOLUME
	42				34	ENTRY 0
	43				35	.
	44		SUB-TYPE		36	.
						.
	45				37	.
			.			.
			.			.
			.			VOLUME
			.			ENTRY
116					78	7

DISC LABEL (cont)

SECTOR 0

SLAVE VOLUME

	0		0
	1		1
	2	0	2
	3		3
	4		
SC = SCRATCH	5		
VOLUME	-----		
MV = MASTER	6 SC MV SR	6 TYPE 11 12 SUB-TYPE	15 6
VOLUME = 0	-----		
SR = SERIAL	7	GENERATION INDEX	7
VOLUME	-----		
	10	0	8
	11		9

	12		10
	13	VOLUME	11
	14	NAME	12
	15		13

	16	INITIAL DATE	14

	17	0	15
	20		16

	21		17
	22	ACCOUNT	18
	23	NAME	19
	24		20

	25		21
	26	GROUP	22
	27	NAME	23
	30		24

	31		25
	32	VOLUME SET	26
	33	NAME	27
	34		28

.....

**120 DEFECTIVE
TRACKS MAXIMUM**

DEFECTIVE TRACKS TABLE (CONT.)

170	DEFECTIVE TRACK NUMBER	DTC	120
171			121
172			122
173	RESERVED FOR FUTURE USE		123
174			124
175			125
176	NEXT AVAILABLE ALTERNATE TRACK		126
177	LOGICAL DISC PACK SIZE (CYLINDERS)		127
	OR # OF TRACKS IF FH DISC		

DTC	(DEFECTIVE TRACK CODE)
0	suspect
1	suspect alternate
2	deleted
3	reassigned

NOTE: The situation where there are two entries for the same track, n, one having a DTC of 0 (suspect) and the other having a DTC 3 (reassigned) results from a situation where the disc driver could not "read" (unreadable) the address of the particular track.

DISC COLD LOAD INFORMATION TABLE (SECTORS 28-29)

0	pointer to table information	FAEFTR	>-----
1	pointer to temporary CST info	TCSTPTR	
2	# of entries to read on disc cold load	NREAD	
3	# of code segments in INITIAL	NVTCST'	
4	INITIAL's DB value	INITDB	
5	INITIAL's DL value	INITDL	
6	INITIAL's Z value	INITZ	
7	INITIAL's Q value	INITQ	
8	INITIAL's S value	INITS	
9	SYSDISC type subtype	DISCTST	
10	cold load ID	COLD'LOAD'ID'	
11	log file number	LOG'FILE'NUM'	
12	directory disc		
13	address	DIRADR	
14	ldev 1 virtual memory		
15	disc address	VIRMEMADDR	
16	# LOG PROCS		
17	LOG ID's		
18	RIN table		
19	disc address	RINADR	
20	directory size	DIRSECT	
21	#sectors in virtual memory region of LDEV 1	SECTORS IN LDEV1 VM	
22	UNUSED		
23	RIN table size	RINSECT	
24	# of RINS	RINS	

DISC COLD LOAD INFORMATION TABLE (CONT.)

25	# of global RINS	GRINS
26	TL RL RY	TL=Tape cold load LOAD MODE RL=Reload RY=recovery
27	HIGHEST VOL # # OF VOLUMES	H'VOL'
28	disc cold load entry point	DISCENTRY
29	system disc DRT number	SYSDISCDRT
30	Job Master Table	JMATLOC
31	Disc Address	
32	IDD Disc Address	IDDLOC
33		
34	ODD Disc Address	ODDLOC
35		
36	Welcome Message (DST 47 10)	LOGONLOC1
37	Disc Address	
38	Welcome Message (DST 48 10)	LOGONLOC2
39	Disc Address	
40		
41	LOG ID ADDRESS	
42		
43	LOG TAB ADDRESS	
44		
45	LOG ID SIZE	
	LOG TAB SIZE	
	SIZE IN WORDS	FAEFTR+0 <-----
	MEMORY ADDRESS	*DRIVER
		TABLE
	DISC ADDRESS	

DISC COLD LOAD INFORMATION TABLE (CONT.)

SIZE IN WORDS		FAEFTR+4
MEMORY ADDRESS	*CTAB0	
DISC ADDRESS		
SIZE IN WORDS		FAEFTR+8
MEMORY ADDRESS	*CTAB	
DISC ADDRESS		
SIZE IN WORDS	*	FAEFTR+12
MEMORY ADDRESS	COMMUNICA- TION SUB- SYSTEM	
DISC ADDRESS	DRIVER TABLE	
SIZE IN WORDS	*	FAEFTR+16
MEMORY ADDRESS	COMMUNICA- TION SUB- SYSTEM	
DISC ADDRESS	DEFINITION TABLE	
SIZE IN WORDS		FAEFTR+20
MEMORY ADDRESS	COMMUNICA- SUBSYSTEM	
DISC ADDRESS	TABLE	
SIZE IN WORDS		FAEFTR+24
MEMORY ADDRESS	LOGICAL- PHYSICAL	
DISC ADDRESS	DEVICE TABLE	

SIZE IN WORDS		FAEFTR+28
MEMORY ADDRESS	LOGICAL- DEVICE TABLE	
DISC ADDRESS		
SIZE IN WORDS		FAEFTR+32
MEMORY ADDRESS	DEVICE CLASS TABLE	
DISC ADDRESS		

DISC COLD LOAD INFORMATION TABLE (CONT.)

SIZE IN WORDS	VOLUME	FAEFTR+36
MEMORY ADDRESS	TABLE	
DISC ADDRESS		
SIZE IN WORDS	LOGICAL	FAEFTR+40
MEMORY ADDRESS	DEVICE	
	TABLE	
DISC ADDRESS		
STACK SIZE	INITIAL's	FAEFTR+44
MEMORY ADDRESS	STACK	
DISC ADDRESS		
SEGMENT SIZE	INITIAL's	TCSTPTR
MEMORY ADDRESS	SEGMENTS	
DISC ADDRESS		
(MORE SEGMENTS OF INITIAL)		

INITIAL PROGRAM CST MAP

LOGICAL CST#	PHYSICAL CST#	SEGMENT NAME
17	37	BOOTSTRAP
16	36	RESIDENT ----> core resident
15	35	MAINSEG1 \
14	34	CONFIGURE non-core resident
13	33	DEFCTRACKS but present in core
12	32	SETUP ----- at completion of
11	31	FILEIO cold load
10	30	DISKSPACE
7	27	DIRECTORY1
6	26	DIRECTORY2/
5	25	SL PROGRAM
4	24	PROCESS
3	23	MAINSEG1B
2	22	MAINSEG2
1	21	MAINSEG3
0	20	MAINSEG4

*code segment swapping starts at completion of MAINSEG1

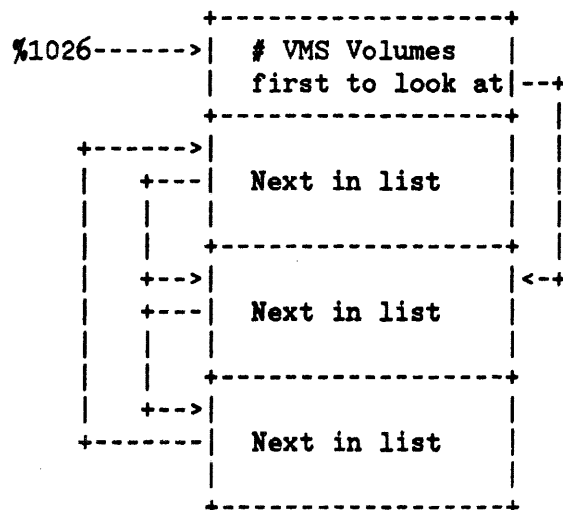
Virtual Disc Space Management Structures

Disc space for data segments is allocated from reserved regions of system volumes which have been assigned the virtual memory supporting (VMS) attribute. The data structure used for accounting and management of the virtual disc space of the various VMS volumes is the Virtual Disc Space Management Table (VDSMTAB). This structure consists of a circular list of entries, one for each VMS volume. Each entry contains the information defining the state of the virtual memory region on that volume.

Virtual Disc Space Management Table

VDSMTAB DST# = 39 (%47)
VDSMTABPTR = %1026

General Structure



VDSMTAB Entry 0 Format

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
VDSMTAB00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	TABLELENGTH
	#WORDS IN VDSMT																
VDSMTAB01	# SYSTEM VOLUMES WHICH HAVE VIRTUAL MEMORY																VMSVOLUMEcnt
VDSMTAB02	INDEX OF NEXT ENTRY TO ALLOCATE FROM																STARTENTRY
VDSMTAB03	VM PAGE SIZE (512)																VMPAGESIZE
VDSMTAB04	# SECTORS/VM PAGE (4)																SECTORS/PERVMPAGE
VDSMTAB05	OFFSET FROM ENTRY TO BITMAP (%20)																OFFSETTOBM
VDSMTAB06	TOTAL # VM PAGES CONFIGURED IN SYSTEM																
VDSMTAB07	LEAST # OF VM PAGES THAT HAVE EVER BEEN AVAIL.																
	VDSMTAB %10-%17 UNASSIGNED																

VDSMTAB GENERAL ENTRY FORMAT

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15																
Word 0	--		--		--		--		--		--		--		--		---	INDEX OF NEXT ENTRY IN CIRCULAR LIST	NEXTINLIST													
Word 1	-----																	LDEV#	LDEV													
Word 2	-----																	STARTING SECTOR OF DEVICE'S	HOSTARTSECTOR													
Word 3	-----																	VIRTUAL MEMORY REGION	LOSTARTSECTOR													
Word 4	-----																	# SECTORS IN DEVICE'S	TOTAL SECTOR													
Word 5	-----																	VIRTUAL MEMORY REGION	COUNT													
Word 6	-----																	# PAGES IN DEVICE'S VIRTUAL MEMORY REGION	TOTAL PAGECNT													
Word 7	-----																	# OF PAGES AVAILABLE IN DEVICE'S VM REGION	PAGESAVAILABLE													
Word %10	-----																	# OF VALID WORDS IN DEVICE'S BIT MAP	BMLENGTH													
Word %11	-----																	SIZE OF SMALLEST RECENT MISS	SMALLESTMISS													
WORD %12	-----																	SMALLEST NUMBER OF PAGES EVER AVAILABLE														
%13-%20	-----																	UNASSIGNED														
	-----																	DEVICE'S VIRTUAL MEMORY BIT MAP														

***COMMENT: A bit on in a device's VMBIT MAP
==> Corresponding VM page is free.

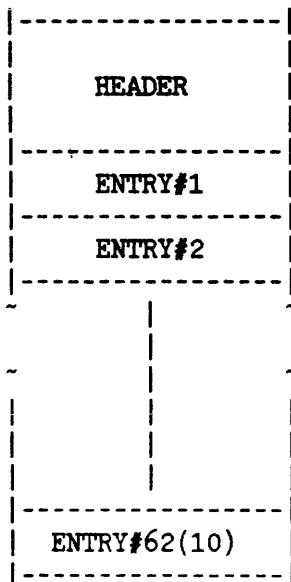
DISK FREE SPACE TABLE

There is one disc-free-space table for each disc in the system. The table begins at sector #30(10) and its size is specified within the table itself. The table is read one page at a time, as needed, into an extra data segment (DST #17(10)). A page consists of one or more sectors and is currently equal to 2 sectors. The table is kept packed at all times and disc addresses are in ascending order. Any two entries represent two disjoint areas on the disc.

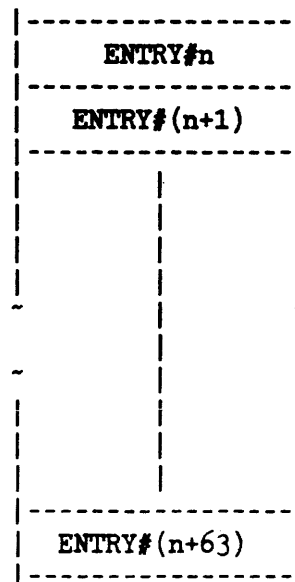
DISCSPC can be called to:

1. Fetch a specified size at any location. If the space allocated corresponds exactly to one table entry, the entry is deleted and the table collapsed.
2. Fetch a specified size at a particular location. If the location is in the middle of a free area, an additional table entry is created and the table expanded. If the location abuts either end of a free area, the table size is unchanged; if it abuts both ends, the table is collapsed as above.
3. Return a specified size at a particular place. The table will be expanded if the returned space does not abut free space.

format of page #1



format of succeeding pages



DISC FREE SPACE TABLE (CONT.)

HEADER FORMAT (8 WORDS)

word index		doubleword index
	#ENTRIES IN TABLE	
0	TABLE SIZE(SECTORS)	0
1		
2	LOWER BOUND FOR FREE SPACE (SECTOR#)	1 MIN
3		
4	UPPER BOUND FOR FREE SPACE (SECTOR#)	2 MAX
5		
6	////////////////////	3
7	////////////////////	

MIN & MAX are disc addresses indicating the minimum and maximum disc addresses accountable by DISCSPC (i.e. no space which goes outside these bounds may be requested or returned).

ENTRY FORMAT (4 WORDS/ENTRY)

word index		doubleword index
0	SECTOR NUMBER WHERE SPACE STARTS	0
1		
2	#SECTORS AVAILABLE	1
3		

VOLUME TABLE

SIR #22=%26

DST #29=%35

zero entry																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
word	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	# OF ENTRIES																
0	(NOT COUNTING ZERO)								ENTRY SIZE=16(8)								0

1	COLD LOAD ID																1

2	SYSVOLNUM																.

3	VIRTUAL MEMORY INTEGRITY NUMBER																.

.																.	
.																.	

15	////////////////////////////////////															13	

TYPICAL PRIVATE VOLUME ENTRY

0					0	indexed by
1					1	volume #
2	VOLUME				2	
3	NAME				3	
4					4	
5					5	
6	GROUP				6	
7	NAME				7	
8					8	
9					9	
10	ACCOUNT				10	
11	NAME				11	
12						
13						
14	LOGICAL DEVICE #		VMS	UN	NS	SC
	(=0 IF NOT MOUNTED)					
15	VSET VIABX	MVTABX				

NS - NON-SYSTEM
DOMAIN
SC - SCRATCH
UN - UNREADABLE/
UNFORMATTED

TYPICAL SYSTEM VOLUME ENTRY

0					0	indexed by volume #
1	VOLUME NAME				1	
2					2	
3					3	
4	0				4	
5					5	
6					6	
7					7	
10	STARTING SECTOR OF VOLUME'S VM (0 if none)				8	
11					9	
12	NUMBER OF SECTORS RESERVED FOR VM ON VOLUME (0 if none)				10	
13					11	
14	LOGICAL DEVICE # (=0 IF NOT MOUNTED)		VMS UN NS SC			NS - NON-SYSTEM DOMAIN
15	VSET VTABX	MVTABX				SC - SCRATCH
						UN - UNREADABLE/ UNFORMATTED
						VMS - VIRTUAL MEMORY SUPPORTING

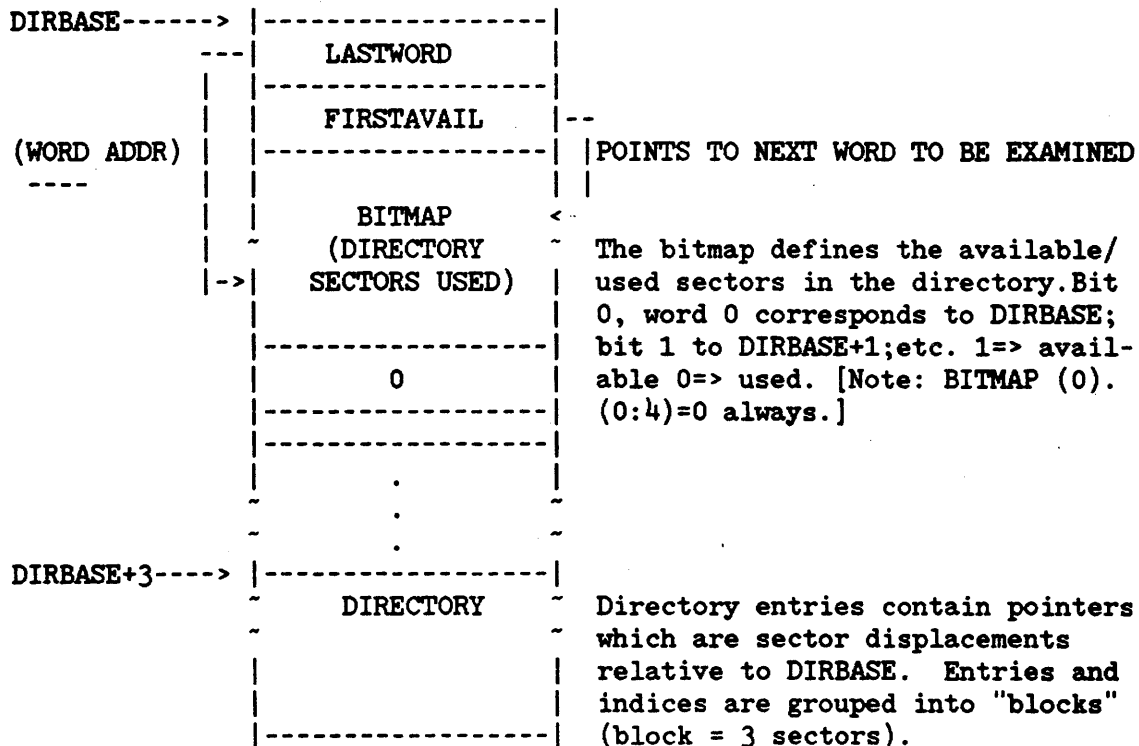
CHAPTER 4 DIRECTORY

DIRECTORY

Directory on disc consists of a contiguous area

SYSGLOB cells:

DIRBASE<-----absolute disk addr of base [SYSGLOB+%130 AND %131]



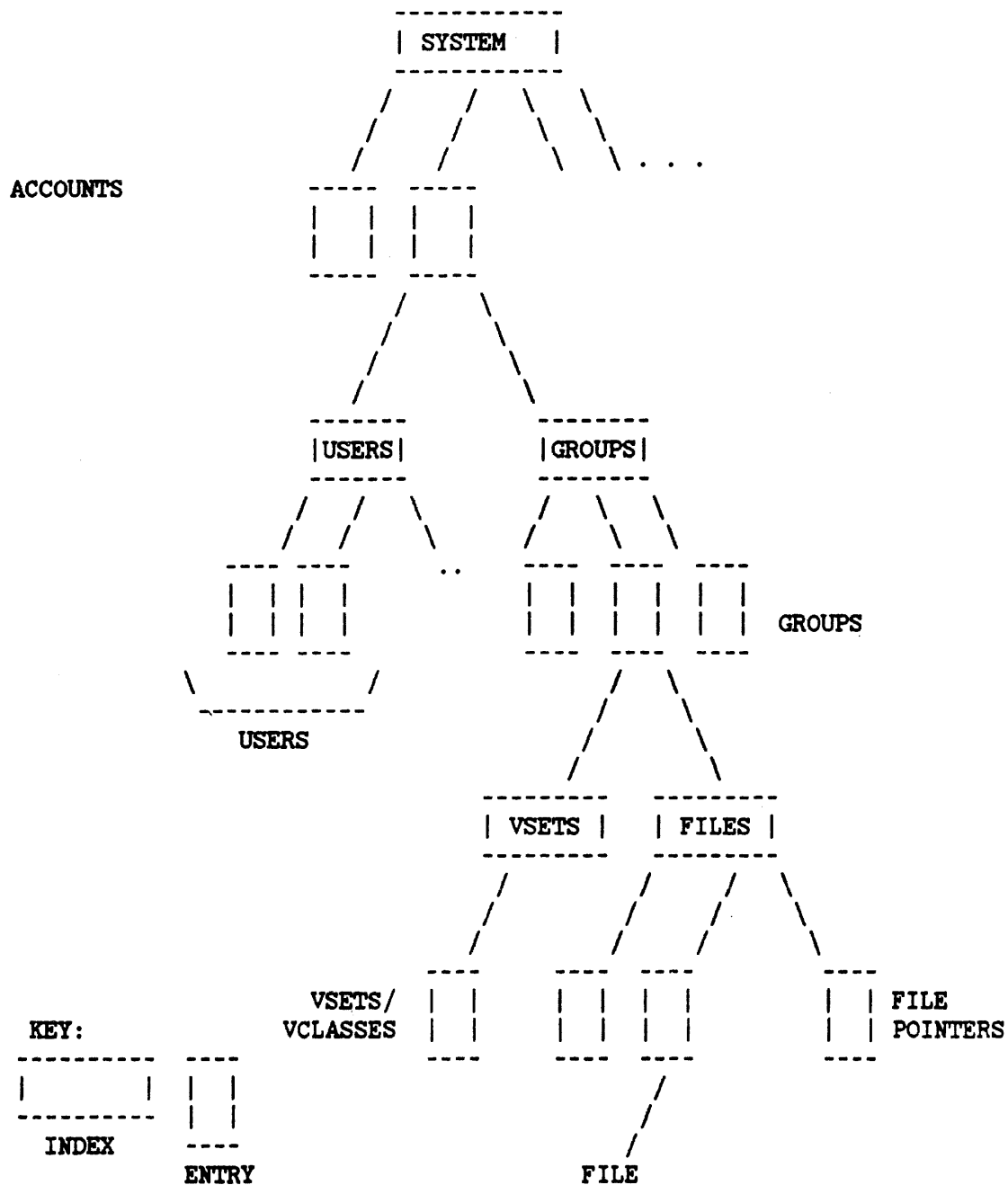
The capacities for accounts/groups/users/files are dependent on their block sizes, described in the directory data segment.

* SYSSAIBSIZE	System acct index block size (sectors)
SYSAUIBSIZE	Acct. user index block size (sectors)
SYSAGIBSIZE	Acct. group index block size (sectors)
SYSGFIBSIZE	Group file index block size (sectors)
SYSGVSIBSIZE	Group volume set definition ind. blk. size(sectors)
* SYSAEBSIZE	Acct. entry block size (sectors)
SYSUEBSIZE	User entry block size (sectors)
SYSGEBSIZE	Group entry block size (sectors)
SYSFEBSIZE	File entry block size (sectors)
SYSMAEBSIZE	Maximum of above. (used to initialize DDS.)
SYSVSEBSIZE	Volume set definition entry block size (sectors)

*These values are used once for the creation of the (root) system, account index or new systems. This root index is always at address DIRBASE+3.

OVERVIEW OF DIRECTORY

OVERVIEW OF DIRECTORY



DIRECTORY DATA SEGMENT

0	-----	0	DST=20(10)
.	SECTOR	.	SIR=8(10)
.	BUFFER	.	
.	128(10) WORDS	.	
177	-----	127	
200	ADJUST (DB-DL)	128	
201	XTYPE (INPUT PARM)	129	
202	: XMVTABX	130	
203	XINDEXP (FINAL INDEX PRT)	131	
204	XANAME (DB REL ADDR)	132	
205	XGUNAME (DB REL ADDR)	133	
206	XFNAME (DB REL ADDR)	134	
207	XASEC (ACCOUNT SECURITY)	135	
210	-----	136	
211	-XGSEC (GROUP SECURITY) -	137	
212	SIRRETURN (FROM GETSIR)	138	
213-240	DIRECTORY POINTER "A"	139-160 \	
241-266	DIRECTORY POINTER "B"	161-182 /	> SEE Directory Pointer Area
267	////////////////////////////////	183	
270	LDEV : DIRECTORY	184	
271	BASE DISC ADDRESS	185	
SYSSAIBSIZE=3	SYS.ACCT.INDEX BLK SIZE	186	
AUI=1	ACCT.USER INDEX BLK SIZE	187	
AGI=1	ACCT.GRP INDEX BLK SIZE	188	
GFI=2	GRP FILE INDEX BLK SIZE	189	
GVSI=1	GRP VOL DEF INDEX BLK SIZE	190	
AEB=3	ACCT ENTRY BLK SIZE	191	

DIRECTORY DATA SEGMENT (CONT.)

UEB=2	USER ENTRY BLK SIZE	192
GEB=2	GRP ENTRY BLK SIZE	193
FEB=2	FILE ENTRY BLK SIZE	194
VSEB=1	VOL DEF ENTRY BLK SIZE	195
DDSBSIZE=3	MAX.SIZE DIRECTORY BLOCK	196
DDSBWSIZE=%600	DDSBSIZE*128	197
	DISTRIBUTION	198
GOODPERCENT=.85	-	-
307	FACTOR	199
310	BASE	200
311		201
	DA AREA	DDSBWSIZE

	WORK AREA (SIZE OF LARGEST ENTRY)	MAX

1145		613
	DB AREA	DDSBWSIZE

DIRECTORY POINTER AREA [DA OR DB]

DST=20(10)

SIR=8(10)

^	-----		138/	
	LDEV	DIRECTORY BASE	160	DIRBASE1'
	-----		139/	
	ADDRESS OF PAGE IN BUFFER		161	DIRBASE2'
	-----		140/	
	DIRECTORY PAGE IN BUFFER		162	CONTENTS
	-----		141/	
	DB ADDRESS OF 1ST ELEMENT		163	LPNTR
	-----		142/	
	STARTING ADDRESS OF BUFFER		164	IOPNTR
	-----		143/	
	# VALID PAGES IN BUFFER		165	NUMVALID
	-----		144/	
	DIRTY FLAG		166	DIRTY
	-----		145/	
	ELEMENT SIZE		167	XSIZE
**	-----		146/	
	# WORDS USED IN BLOCK		168	USED
	-----		147/	
	BLOCK SIZE (SECTORS)		169	BSIZE
	-----		148/	
	BLOCK SIZE (WORDS)		170	BWSIZE
	-----		149/	
	MAX # ELEMENTS/BLOCK		171	BFACTOR
	-----		150/	
	I P	TY ELEMENT SIZE BLOCK SIZE	172	MISCWD

	(WORDS) (SECTORS)			
	-----		151/	
	NUMBER OF ELEMENTS		173	XCOUNT
v	-----		152/	
	NUMBER OF ACCESSORS		174	PCOUNT
^	-----		153/	
	ENTRY TOTAL		175	ETOTAL
	-----		154/	
	O P	TY ENTRY SIZE BLOCK SIZE	176	EMISCWD

	(WORDS) (SECTORS)			
	-----		155/	
	FATHER INDEX POINTER		177	PINDEXP
	-----		156/	
	F		178	
*	-----		157/	
	A		179	PNAME
	-----		158/	
	T	N	180	
	-----		159/	
	H	A	181	

	E	M		

	R	E		
v	-----			

NOTE:

** INDEXES AND ENTRIES

* INDEXES ONLY

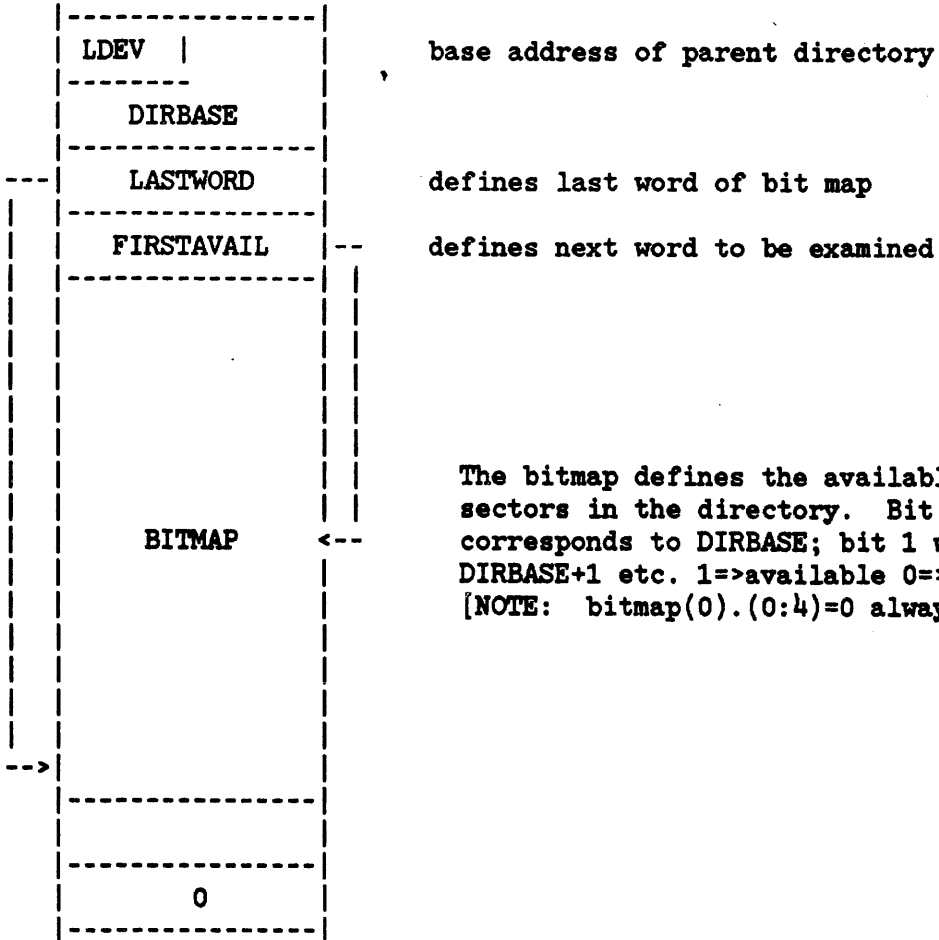
TY = 0-FILE
1-GROUP
2-ACCT
3-USER
4-VSD

I = 0-ENTRY BLOCK
1-INDEX BLOCK

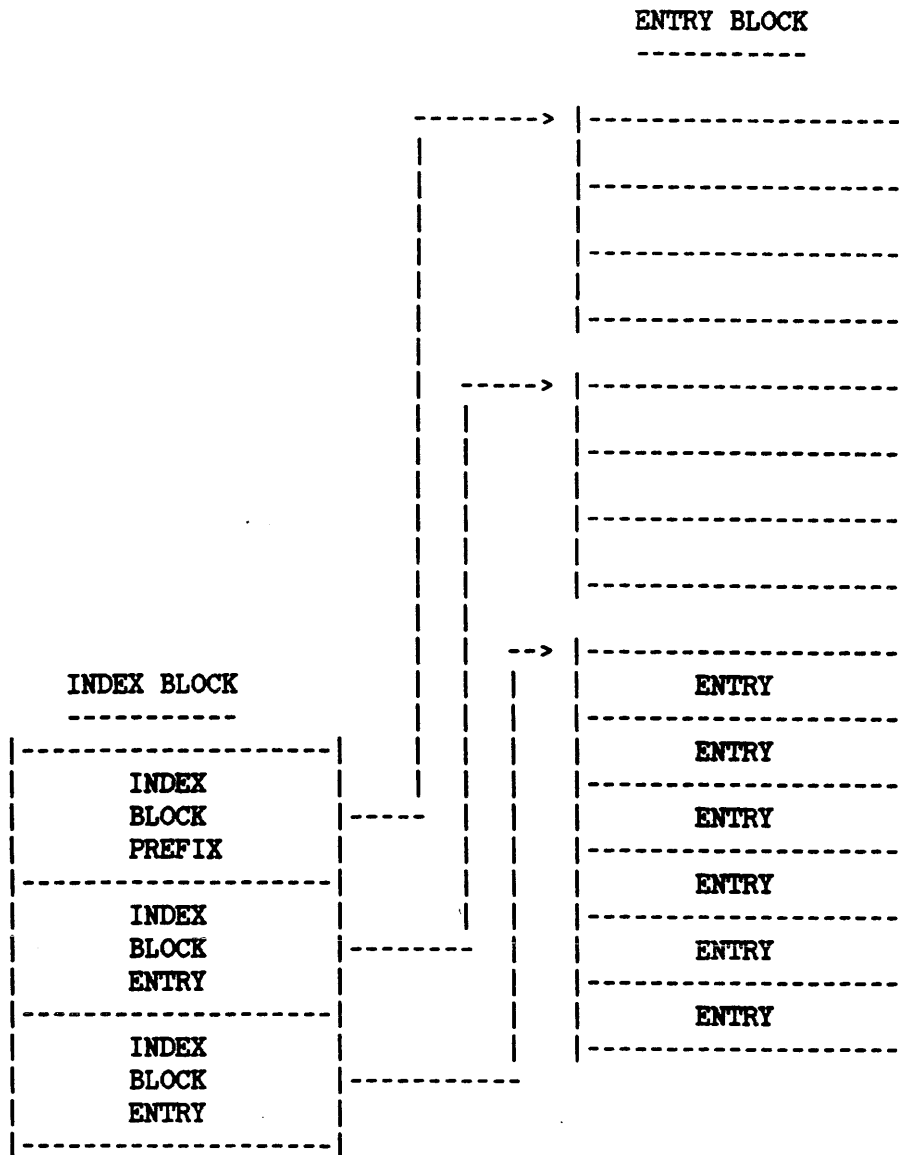
P = PURGE FLAG

DIRECTORY SPACE DATA SEGMENT (DIRSDS)

DST=21
10
SIR=8
10



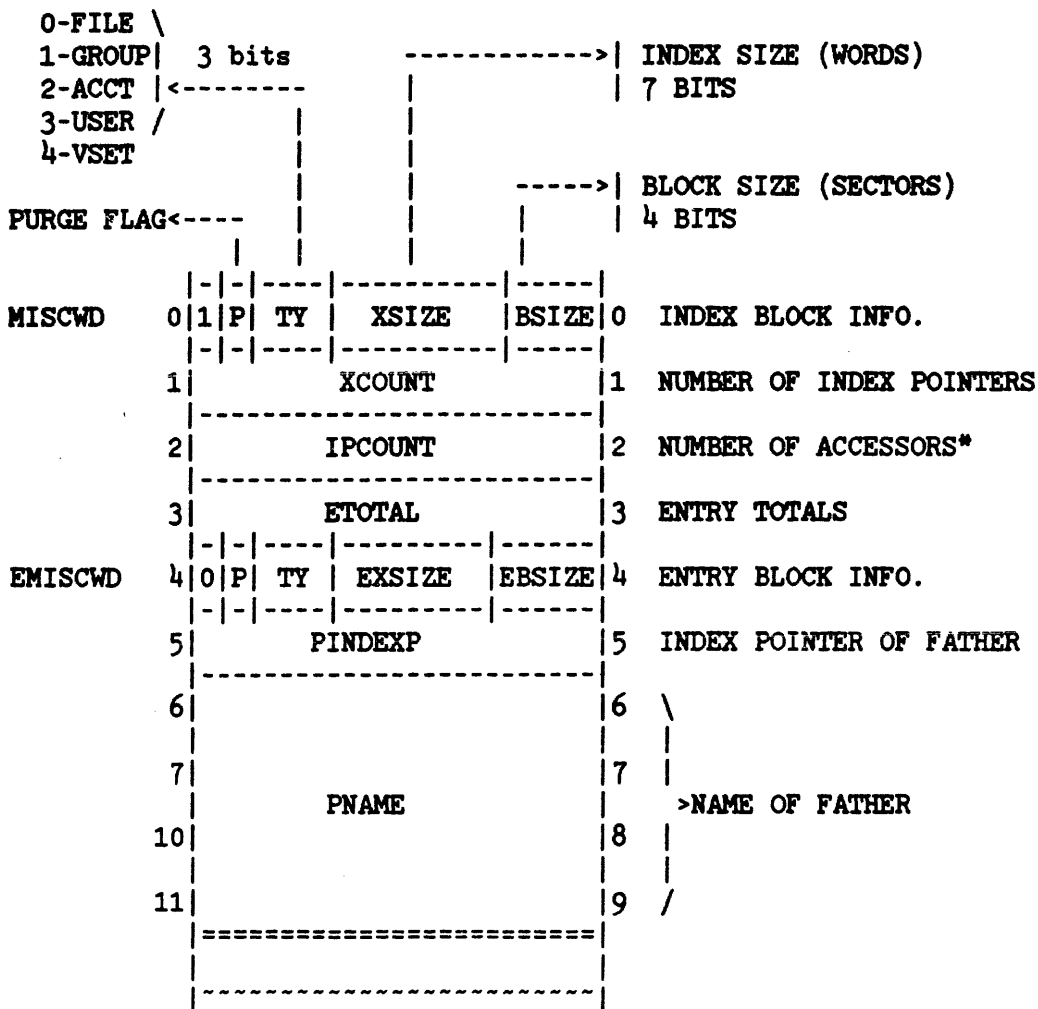
DIRECTORY STRUCTURE



DIRECTORY DEFINITIONS

- >PAGE - smallest allocatable record ("phys.recd")-currently sector.
- >BLOCK - integral# of pages; contains contiguous indices or entries.
- >INDEX - pointer to entry block, containing name of 1st entry.
- >ENTRY - information-containing "object" may contain pointer to an index block.
- >POINTER - 15-bit positive relative page number (relative to directory base).
- >DDS - directory data segment.
- >ELEMENT - a generic name for index or entry.

INDEX BLOCK PREFIX (10 WORDS)



*The count is incremented by each access that uses and relies upon a pointer to the index block, ie, it is guaranteed not to be purged while the count is not = 0.

INDEX ENTRY (6 WORDS)

IE1STNAME	0	1st NAME OF ENTRY BLOCK
	1	
	2	
	3	
IEPNTR	4	POINTER TO ENTRY BLOCK
IECOUNT	5	NUMBER OF ENTRIES IN ENTRY BLOCK

ACCOUNT ENTRY (%36 WORDS)

0	ANAME	0	
1		1	ACCT.NAME
2		2	
3		3	
4	AGIPNTR	4	ACCT.GROUP INDEX POINTER
5	AUIPNTR	5	ACCT.USER INDEX POINTER
6	ACAP		CAPABILITY
7		7	
10	ALATTR	8	LOCAL ATTRIBUTES
11		9	
12	APASS	10	PASSWORD
13		11	
14		12	
15		13	

GROUP ENTRY (%51 WORDS)

0		0	GROUP NAME
1		1	
2	GNAME	2	
3		3	
4	GFIPNTR	4	GROUP FILE INDEX POINTER
5		5	
6	GPASS	6	PASSWORD
7		7	
10		8	
11	GDFSCOUNT	9	DISC FILE SPACE COUNT (SECTORS)
12		10	
13	GDFSLIMIT	11	DISC FILE SPACE LIMIT (SECTORS)
14		12	
15	GCPUCOUNT	13	CPU TIME COUNT (SECONDS)
16		14	
17	GCPULIMIT	15	CPU TIME LIMIT (SECONDS)
20		16	
21	GCONTIMECOUNT	17	CONNECT TIME COUNT (MINUTES)
22		18	
23	GCONTIMELIMIT	19	CONNECT TIME LIMIT (MINUTES)
24		20	
25	*P	21	GROUP SECURITY (SEE BELOW)
	--		
	GSEC		
26			*P = PURGE FLAG

GROUP ENTRY (CONT.)

27	GCAPABILITY	23	GROUP CAPABILITY
30	GLINKAGE	24	GROUP DIR. BASE LINKAGE
31	GVSDIPNTR	25	GROUP VOL SET DEFN INDX
32	GHVSNAME	26	HOME VOL SET NAME
33	-	27	-
34	GHVSANAME	28	(Definition's acct name)
35	-	29	-
36	-	30	-
37	GHVSGNAME	31	(Definition's group name)
40	-	32	-
41	-	33	-
42	-	34	-
43	GHVSVSNAME	35	(Definition's vol set name)
44	-	36	-
45	-	37	-
46	GSAVEFIPNTR	38	SAVE CELL FOR GFIPNTR
47	GMOUNTREFCNTR	39	GROUP BIND COUNTER
50	0	40	GSPARE

GROUP ENTRY (CONT.)

GLINKAGE (0:1) = 0; System Domain
(0:1) = 1; Private Volumes
(8:8) = 0; Not Bound
(8:8) <>0; Bound

GROUP SECURITY MASK

	P	///	R	R	R	R	R	A	A	A	A	A	W	W	W	W	
25		///	ANY	AC	AL	GU	GL	ANY	AC	AL	GU	GL	ANY	AC	AL	GU	
	W	L	L	L	L	L	X	X	X	X	X	S	S	S	S	S	
26	GL	ANY	AC	AL	GU	GL	ANY	AC	AL	GU	GL	ANY	AC	AL	GU	GL	

FILE ENTRY (FILE POINTER)(6 WORDS)

FNAME	0	FILE NAME
	1	
	2	
	3	

FVTABINX	4	VOL TABLE INDX / FILE LABEL DISC
-----		ADDRESS
FLABELADDR	5	

USER ENTRY (19 WORDS)

0	-----	0	USER NAME
1	UNAME	1	
2		2	
3		3	
4	-----	4	CAPABILITY
5	UCAP	5	
6	-----	6	LOCAL ATTRIBUTES
7	ULATTR	7	
10	-----	8	PASSWORD
11	UPASS	9	
12		10	
13		11	
14	-----	12	HOME GROUP (MAY BE NULL)
15	UHGROUP	13	
16		14	
17		15	
	-----		LOG CNT (# OF USERS LOGGED ON)
20	ULOGCOUNT	16	INIT TO 1 FOR MANAGER.SYS SO
	-----		THIS USER CANNOT BE PURGED
UMAXJOBW 21	*P U 0 JOBPRI	17	MAX.JOB PRI;*P=PURGE FLAG
	-----		U=UDC EXIST FLAG
22	COMM FILE REC #	18	
	(command file loc of		
	user udc's)		

4-15

VOLUME SET DEFINITION ENTRY

	0				0	
	1				1	VOLUME
	2		GVSNAME		2	SET
	3				3	NAME
TY = 0	4	TY	1	7	MVTABX	4 GVSLINKAGE
	5	VOL COUNT	4	7	VMASK	5 GVSINFO
	6				6	MEMBER VOLUME
	7				7	NAME (1ST ENTRY
VOLUME	10		GVSVOLUME		8	IS MASTER
ENTRY 0	11				9	VOLUME)
(6 WORDS)	12	0		14	M	10 GSVVOLFLAGS
	13	SUB-TYPE		VTABX		11 GSVVOLINFO
	14					12
VOLUME	.		.			.
ENTRIES	.		.			.
1 - 7	.		.			.
	57		.			.
	60					48
	61					49
	62		GVSVOLUME			50 MEM. VOL.
	63					NAME
	64	GSVOLFLAGS	(MEMBER VOLUME FLAGS)			52
	65	GSVOLINFO	(MEMBER VOLUME INFO)			53
	66	GVSDREFCNT	(DEFN. REF. CNTR.)			54
	67	0				55 SPARE

TY = 0 VOLUME SET

= 1 VOLUME CLASS

MVTABX: MOUNTED VOLUME TABLE INDEX (IF MOUNTED)

VOL COUNT: NO. OF VOLUMES

VMASK: VOLUME MASK

M = 0 NOT MOUNTED

= 1 MOUNTED

VTABX: VOLUME TABLE INDEX

GVSLINKAGE

[illegible]

T - TYPE

1 = Volume Set Definition

0 = Volume Set Class

A - ALLOCATING FLAG

0 = not initially allocating (not 1st user of set)

1 = 1st user of set allocating resources (transitional)

MVTABX - Mounted Volume Table Index

0 if volume set not logically mounted

GV S I N F O

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
VOLCNT				NOT USED				VSMASK							

VOLCNT - Number of members in set

VSMASK - Bit mask of volume member usage

Order is from right to left

i.e. bit 15 is 1st member, bit 14 is 2nd member ...

GVSVOLFLAGS

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
NOT USED															M

M - Member Mounted Flag

0 = not mounted

1 = mounted

GVSVOLINFO

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DISK								VTABX							
SUB-TYPE															

VTABX - Volume Table Index

VOLUME SET CLASS ENTRY

1 1 1 1 1 1										
0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5										
0									0	VOLUME CLASS NAME
1	GVCNAME								1	
2									2	
3									3	
4	GVCLINKAGE								4	VOLUME CLASS IDENTIFICATION
5	GVCINFO								5	VOLUME CLASS INFORMATION
6	GVCPNAME								6	PARENT VOLUME SET DEFINITION
7									7	
10	GVCPANAME								8	ACCOUNT OF PARENT DEFINITION
11									9	
12									10	
13									11	
14	GVCPGNAME								12	GROUP OF PARENT DEFINITION
15									13	
16									14	
17									15	
20	GVCPVSNAME								16	VSNAME OF PARENT DEFINITION
21									17	
22	0								18	
23	0								19	
~										
67	0								55	

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
T	0				NOT USED								0			

T - TYPE

- ```
1 = Volume Set Definition
0 = Volume Set Class
```

G V C I N F O

|        |   |   |   |          |   |   |   |        |   |    |    |    |    |    |    |
|--------|---|---|---|----------|---|---|---|--------|---|----|----|----|----|----|----|
| 0      | 1 | 2 | 3 | 4        | 5 | 6 | 7 | 8      | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| VOLCNT |   |   |   | NOT USED |   |   |   | VCMASK |   |    |    |    |    |    |    |

**VOLCNT** - Number of members in set

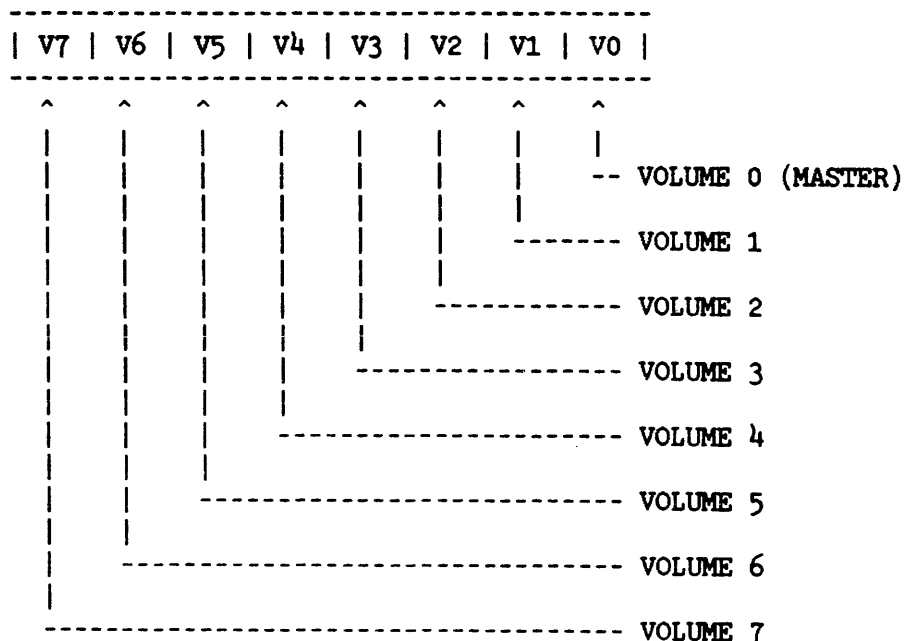
VCMASK - Bit mask of volume member usage (VOLUME CLASS MASK)

Order is from right to left

i.e. bit 15 is 1st member, bit 14 is 2nd member ...

## VOLUME MASK FORMAT

- USED IN MVTAB, PVUSER, FILE CONTROL BLOCK (FCB),  
VOLUME SET/CLASS DEFINITION, VOLUME SET VTAB.
- 8-BIT MASK.



0: NOT MOUNTED OR NON-MEMBER      1: MOUNTED OR MEMBER



# CHAPTER 5 LOCK RESOURCES

SIR# ALLOCATION DST %53

| decimal<br>SIR # | octal<br>SIR # | SIR NAME                |
|------------------|----------------|-------------------------|
| 1                | 1              | LOAD PROCESS SIR        |
| 2                | 2              | LOCK SEGMENT SIR        |
| 3                | 3              | IDD                     |
| 4                | 4              | ODD                     |
| 5                | 5              | PROCESS TREE STRUCTURE  |
| 6                | 6              | SCHEDULING QUEUE        |
| 7                | 7              | CST ENTRIES             |
| 8                | 10             | SYSTEM DIRECTORY        |
| 9                | 11             | LPDT                    |
| 10               | 12             | LDT                     |
| 11               | 13             | STORAGE IN OVERLAY AREA |
| 12               | 14             | DISC FREE SPACE TABLE   |
| 13               | 15             | JPCNT                   |
| 14               | 16             | JCUT                    |
| 15               | 17             | JMAT                    |
| 16               | 20             | FMAVT                   |
| 17               | 21             | LOADER SEGMENT TABLE    |
| 18               | 22             | VDD                     |
| 19               | 23             | SPOOL                   |
| 20               | 24             | MESSAGE CATALOGUE       |
| 21               | 25             | RIT                     |
| 22               | 26             | VOLUME TABLE            |
| 23               | 27             | WELCOME MESSAGE SIR     |
| 24               | 30             | ASSOCIATION TABLE       |
| 25               | 31             | CS ALLOCATE SIR         |
| 26               | 32             | LOGGING BUFFER          |
| 27               | 33             | PV MVTAB                |
| 28               | 34             | MEASSIR                 |
| 29               | 35             | PV USER TABLE           |
| 30               | 36             | IMAGE                   |
| 31               | 37             | KSAM                    |
| 32               | 40             | USER LOGGING            |
| 33               | 41             | DEBUG BREAKPOINT TABLE  |
| 34               | 42             | PCBSIR                  |
| 35               | 43             | SUB-QUEUE MAPPING TABLE |
| 36               | 44             | CILOG                   |
| 37               | 45             | FILE INTEGRITY          |
| 38               | 46             | RIN                     |
| 39               | 47             | TAPE LABELS             |
| 40               | 50             | 1st JOB                 |
| 41               | 51             | 2nd JOB                 |
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| .                | .              | .                       |

## MULTIPLE SIR ALLOCATION

-----

The five conventional chains used by MPE for SIR allocation and deallocation are:

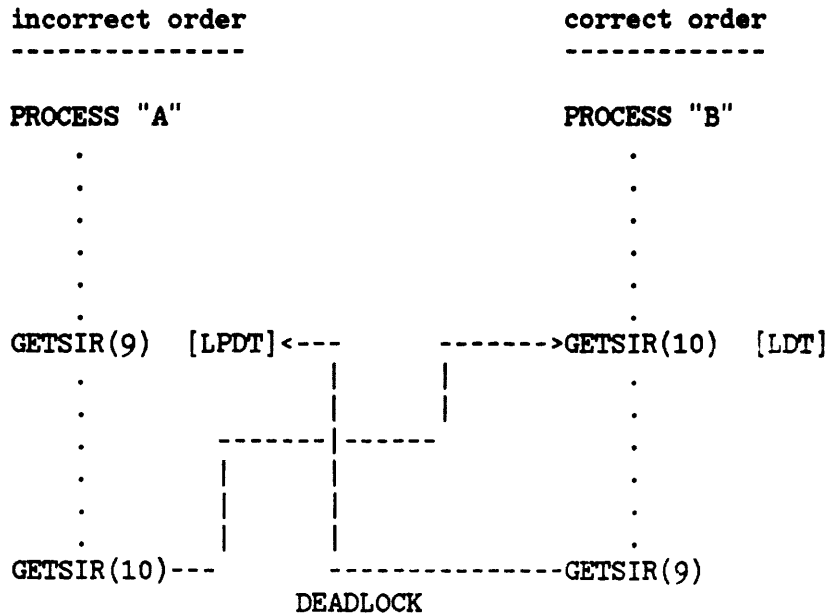
LOWER->LOGICAL RANK->HIGHER

1. LDT(10)->LPDT(9)->VDD(18)
2. JMATSIR(15)->LPDT(9)->JPCNT(13)
3. FMAVTSIR(16)->FILESIR(37)->DIRECT.(8)->DISC FREE SPACE TBLE(12)
4. FMAVTSIR(16)->FILESIR(37)->RINTABLE(38)
5. SEGTABSIR (%21)-> BKPTSIR(%41)-> LOCKSIR(2)

Multiple SIR allocation requires care to avoid process deadlock situations. The rule that should be followed when working with the above SIRs is as follows:

Never attempt a GETSIR of lower rank than the SIR currently held (if any).

For example: suppose two processes, A and B, required the SIRs for the LDT and LPDT. Deadlock would result if done as below due to process A not following the convention order.



## SIR TABLE INFORMATION

-----

The system internal resource table is located in non-linked memory (resident table). The SIR table is used to protect critical system elements against access by more than one process, i.e., it provides a "lock out" mechanism. Each critical system resource (usually a table) is assigned a specific SIR number. Procedures are provided within MPE to lock (GETSIR) and unlock (RELSIR) the SIR. Processes attempting to obtain a SIR that is not available are impeded by the system. The SIR table entries form the head of a linked list in this case. If more than one process becomes impeded, word 8 of the PCB entry is used to add the "new" process to the growing list. The method of disimpeding the process depends on the SIR type.

A SIR does not respect process priority and operates in a FIFO manner. As processes become impeded on behalf of a SIR the new entries are entered at the tail of the impeded list. When the current holder of the SIR releases it, only the first process in the list (pointed at by the head pointer) is dis-impeded. The linked list head and all pointers are then updated and the newly dis-impeded process will obtain the SIR.

# SIR ENTRY FORMATS

|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       |   |                        |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|---|------------------------|
| 0                       | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8                       | 9     | 10    | 11    | 12    | 13    | 14    | 15    |   |                        |
| -----                   | ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   | ----- | ----- | ----- | ----- | ----- | ----- | ----- | 0 |                        |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       | 0 | free                   |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       | 0 | (not locked)           |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       |   |                        |
| PIN of holder           |       |       |       |       |       |       |       | 0                       |       |       |       |       |       |       |       | 0 | SIR locked             |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       | 0 | (no impeded processes) |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       |   |                        |
| PIN of holder           |       |       |       |       |       |       |       | SIR QUEUE LENGTH        |       |       |       |       |       |       |       | 0 | SIR locked             |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       |   |                        |
| TAIL OF IMPEDED LIST(P) |       |       |       |       |       |       |       | HEAD OF IMPEDED LIST(P) |       |       |       |       |       |       |       | 1 | (impeded processes)    |
|                         |       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       |   |                        |

P = PIN#

PIN = PCB table entry number

SIR QUEUE LENGTH- number of processes queued for this SIR

The SIR table is indexed by SIR#, each SIR# corresponding to a unique, preassigned system internal resource. Entry #0 is not used.

Impeded lists are established by using the SIR table entry (1). (8:8) as the head of the list and PCB(8). (8:8) for elements. Pin numbers are always used as pointers, with 0 indicating end of list.



# RIN TABLE GENERAL LAYOUT (Initialized State)

|                                     |                           |    |                  |
|-------------------------------------|---------------------------|----|------------------|
| DST=%26                             | INDEX OF FIRST FREE ENTRY |    |                  |
|                                     | (# LOCAL+GLOBAL RINS)*2   |    |                  |
|                                     | RT   INDEX OF NEXT FREE   | <- | FIRST FREE ENTRY |
|                                     | 0                         |    |                  |
|                                     | RT   INDEX OF NEXT FREE   | -- |                  |
|                                     | 0                         |    |                  |
| RT=RIN TYPE (WHEN ALLOWED)          | RT   INDEX OF NEXT FREE   | <- |                  |
|                                     | 0                         |    |                  |
| 1-LOCAL RIN                         |                           | <- |                  |
| 2-GLOBAL RIN                        | RT   INDEX OF NEXT FREE   | -- |                  |
| 3-FILE RIN                          | 0                         | <- |                  |
|                                     | RT   INDEX OF NEXT FREE   | -- |                  |
|                                     | 0                         |    |                  |
|                                     |                           |    |                  |
|                                     |                           |    |                  |
|                                     | RT   0(EOL)               | <- | LAST FREE ENTRY  |
|                                     | 0                         |    |                  |
|                                     |                           |    |                  |
|                                     | FREE LIST POINTER         | -- |                  |
|                                     | TOTAL #OF ENTRIES         |    |                  |
|                                     | NUMBER FREE ENTRIES       |    |                  |
|                                     | RESERVED                  |    |                  |
|                                     | IF FREE, PTT TO NEXT FREE | 0< |                  |
|                                     |                           | 1  |                  |
|                                     |                           |    |                  |
| LENGTH= # ALLOCATED GLOBAL RINS *12 |                           |    |                  |
|                                     |                           | 10 |                  |
|                                     |                           | 11 |                  |

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$$\text{DST22}(10)=26(8)$$

# RIN TABLE

|                                |                                 |                         |  |
|--------------------------------|---------------------------------|-------------------------|--|
|                                | INDEX OF FIRST FREE ENTRY       |                         |  |
|                                | (NUMBER OF LOCAL+GLOBAL RINS)*2 |                         |  |
|                                |                                 |                         |  |
| JOB INFORMATION TABLE<br>(JIT) | 0 1   INDEX OF NEXT RIN         | -- RIN #1<br>(UNLOCKED) |  |
|                                |                                 |                         |  |
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**P = PIN#**

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$$\text{DST22}(10)=26(8)$$

# RIN TABLE

| INDEX OF FIRST FREE ENTRY       |                                      |
|---------------------------------|--------------------------------------|
| (NUMBER OF LOCAL+GLOBAL RINS)*2 |                                      |
| 1 1                             | //////////////////////////////////// |
| HEAD OF WAITING LIST(P)         | PIN OF HOLDER                        |
|                                 |                                      |

**V**

PCB# waiting processes  
linked through PCB  
impeded queue

**V**

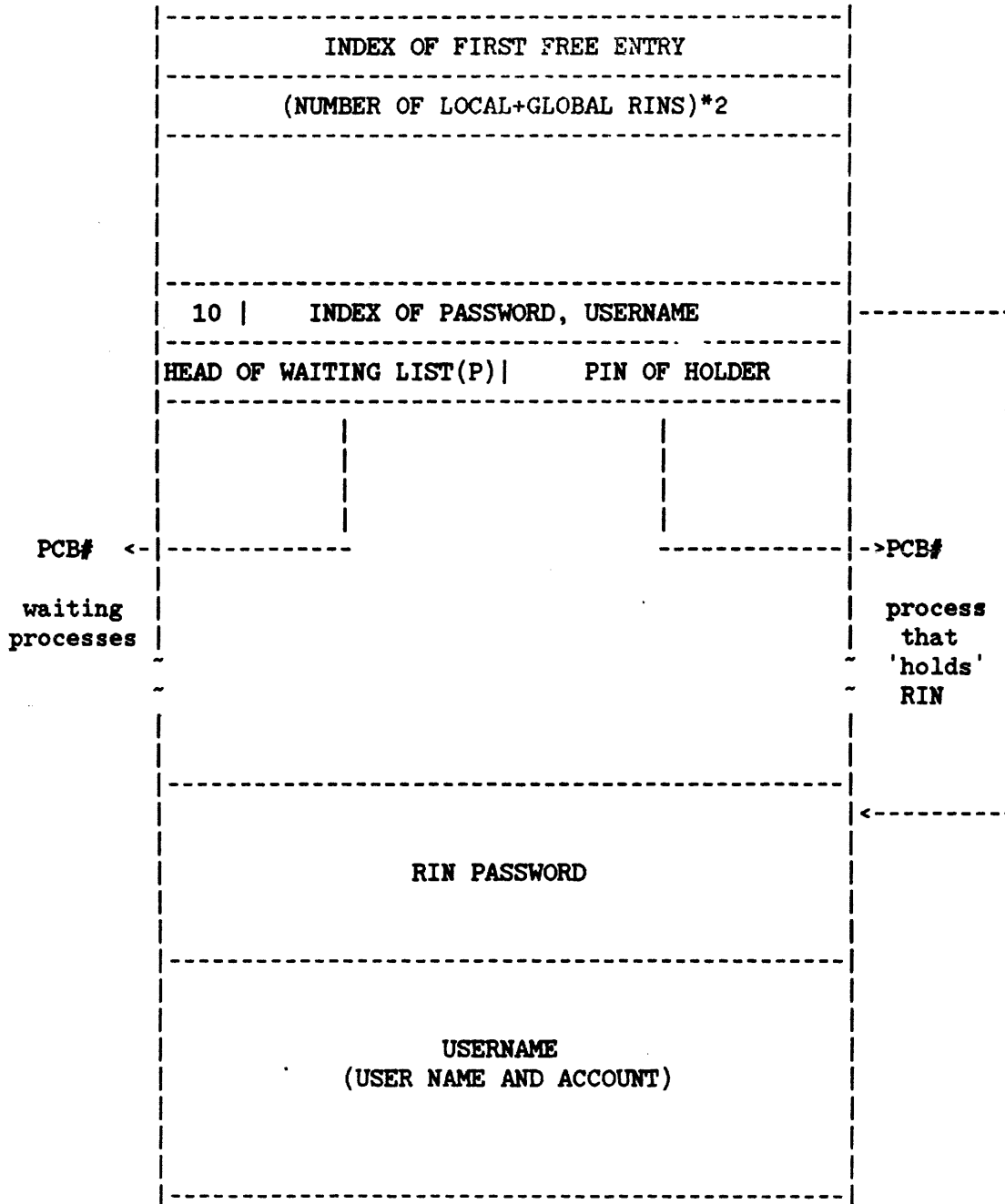
```
PCB# process that
 "holds" rin
```

P=pin#

# ALLOCATION AND LOCKING OF GLOBAL RINS

DST22(10)=26(8)

## RIN TABLE



P=pin#

- 1.0 Introduction
- 2.0 File System Overview
  - 2.1 Buffers
- 3.0 Table Formats
  - 3.1 File System Section of PCBX (PXFILE)
    - 3.1.1 Overhead
    - 3.1.2 Control Block Table (PXFCBT)
    - 3.1.3 Available Block
    - 3.1.4 Available File Table (AFT)
  - 3.2 File Control Block Table (CBTAB)
    - 3.2.1 Overhead
    - 3.2.2 Vector Table (VT)
    - 3.2.3 Control Block Area
    - 3.2.4 Access Control Block (ACB)
    - 3.2.5 Logical Access Control Block (LACB)
    - 3.2.6 Physical Access Control Block (PACB)
    - 3.2.7 File Control Block (FCB)
  - 3.3 File Label (FLAB)
  - 3.4 File Multi-Access Vector Table (FMAVT)
  - 3.5 System Global Area (SYSGLOB)
  - 3.6 SIRs, Locks, and Deadlocks

## 1.0 Introduction

-----

This document describes the MPE-IV file system. Section 2 describes the basic concepts. Section 3 describes the table structures used.

## 2.0 File System Overview

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I/O to files is done by reference to file numbers, which are assigned by calling the FOPEN intrinsic. This establishes an initial "point of attachment", which may be described as a connection between a program (i. e., process) and that particular point in a particular file at which the next FREAD or FWRITE would cause data to be transferred. A point of attachment is described by a control block, of which there are several different kinds (described later). Control blocks may exist in the process's own stack, in an extra data segment assigned by the file system, or (because of file sharing) in some other process' stack. In order to find control blocks quickly, a pointer scheme called vectors is used. A control block is uniquely described by a vector, which consists of one word with the low ten bits containing a segment number, and the upper six containing an index into a table (the "vector table") which describes the location of the control block within that segment. The entire assemblage, consisting of five overhead words, the vector table, and all of the control blocks to which it points, comprises a contiguous piece of storage called the "control block table". If it is in an extra data segment, the control block table comprises the entire segment; if in a stack, it occupies part of the PXFILE part of the PCBX, usually beginning at segment-relative location 106 octal.

The point of attachment is described by a "physical access control block", or PACB, which will exist as a result of an FOPEN to any file (except \$NULL). Any required I/O buffers are associated with the PACB; see section 2.1.

All FOPENs specifying "multi-access" for all processes running under a single job use a single PACB for references to a multi-access file. Although all these are attached to a single point in the file, the type of attachment (i. e., AOPTIONS) may be different. So, each FOPEN specifying a multi-access file establishes a "logical access control block", or LACB, which contains the point-of-attachment local values. The use of a single buffer (i. e., PACB) insures that references by various processes or against various FOPENs within one process are dealt with in strict sequential order. Note that references to a file by other jobs, or by other processes not specifying multi-access, will be through other PACBs, whose buffers will be read or written at the pleasure of the file system; in order to insure any sort of coherence to such shared references, the jobs must use global RINS and FLOCK and FUNLOCK the file. \$STDIN, \$STDLIST, and spoolfiles are opened multi-access automatically.

In the case of disk files, there is another kind of control block: the file control block, or FCB. It contains copies of information read from the file label, such as the end-of-file pointer, the extent map, and the record and block structure. The EOF pointer is updated in the FCB as the file is written, and all changes made to the FCB are posted to the file label when the file is closed. An FCB is shared by all jobs in the system which reference the file.

The file number assigned by an FOPEN is an index into the Available File Table (AFT), a table of four-word entries which is at the end of the PXFILE part of the PCBX. Two of these words are vectors to the PACB and (if it exists) the LACB.

Because control blocks are shared among processes, it is necessary to have a scheme for coordinating access to them. A control block is "locked" by a process which requires exclusive access to it for a time. Other processes which attempt to lock the block will find it already locked, and will be impeded and queued. It may also be necessary to lock an entire control block table so that a process can create or destroy a control block in it, or lock or unlock an existing control block in the table.

Another table used by FOPEN is the File Multi-Access Vector Table (FMAVT). This table exists in a system extra data segment and is used by all jobs and processes in the system. When a file is being FOPENed with multi-access specified, the FMAVT is searched; if the file is already open, the FMAVT gives the PACB vector for the prior reference for each job.

## 2.1 Buffers

---

A bit in AOPTIONS specifies, when a file is opened, whether access is to be buffered or unbuffered. If unbuffered, data is transferred directly between the I/O device and the user's buffer (usually in his stack), which will be frozen in memory for the duration of the transfer. If buffered, the data is moved between the user's buffer and a file system buffer to which the I/O is actually done.

Buffers are associated with the PACB, attached to it as an appendage.

### 3.0 Table Formats

-----

This section gives a detailed discussion of the main tables constructed and used by the file system. The location and overall structure of each table is given, in addition to the table format and a discussion of each field in the table. Table indices at the right of the table are in octal. Index names apply to the entire word; if in parentheses, the names are defined in the file system listing but not explicitly used there.

### 3.1 File System Section of PCBX (PXFILE)

-----

The PXFILE area is a sub-section of the PCBX. It is a contiguous, expandable and contractable block of storage that is managed by the file system primarily for its own use. Other subsystems, namely CS and DS, also make use of the PXFILE section. In doing so they must conform to the conventions of the file system.

The overall structure of the PXFILE area is:

|                        |                   |
|------------------------|-------------------|
| Overhead               | 66<br>(fixed)     |
| Control block<br>table | 106<br>(variable) |
| Available              | (variable)        |
| Active File<br>Table   | (variable)        |
|                        | DL-5              |



### 3.1.1 Overhead

The part labeled Overhead contains information that pertains to the entire section. It ordinarily begins at segment-relative location 66 octal, but is usually addressed via the pointer at DL-3.

| 0                                              | 1 | 7                       | 8 | 15 |             |
|------------------------------------------------|---|-------------------------|---|----|-------------|
| PXFILE size in words                           |   |                         |   | 0  | PXFSIZE     |
| Last DOPEN error no.                           |   | Last COPEN error no.    |   | 1  |             |
| N                                              |   |                         |   |    | 2           |
| Reserved for DS                                |   |                         |   | 3  | (PXFDSINFO) |
| Last KOPEN error number                        |   | Last FOPEN error number |   | 4  |             |
| AFT size in words                              |   |                         |   | 5  | PXAFTSIZE   |
| CS Trace file info                             |   |                         |   | 6  | (PXCTRINFO) |
| Last responding NO-WAIT I/O AFT entry number   |   |                         |   | 7  | PXFLEFTOFF  |
| 1st user (NOCB) control block table DST number |   |                         |   | 10 | PXFCBT1     |
| 2nd user (NOCB) control block table DST number |   |                         |   | 11 | (PXFCBT2)   |
| 3rd user (NOCB) control block table DST number |   |                         |   | 12 | (PXFCBT3)   |
| 4th user (NOCB) control block table DST number |   |                         |   | 13 | (PXFCBT4)   |
| 5th user (NOCB) control block table DST number |   |                         |   | 14 | (PXFCBT5)   |
| 6th user (NOCB) control block table DST number |   |                         |   | 15 | (PXFCBT6)   |
| 7th user (NOCB) control block table DST number |   |                         |   | 16 | (PXFCBT7)   |
| 8th user (NOCB) control block table DST number |   |                         |   | 17 | (PXFCBT8)   |

Partial word field identifiers are:

|             |                     |                        |
|-------------|---------------------|------------------------|
| PXFDOPEN    | = PXFILE(1).(0:8)#, | last DOPEN error code  |
| PXFCOPEN    | = PXFILE(1).(8:8)#, | last COPEN error code  |
| N = PXFNOCB | = PXFILE(2).(0:1)#, | no CB's in PXFILE CBT? |
| PXFKOPEN    | = PXFILE(4).(0:8)#, | last KOPEN error code  |
| PXFFOPEN    | = PXFILE(4).(8:8)#, | last FOPEN error code  |

Discussion:

|            |                                                                                                                                                                                                                                                                                                                                                                    |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PXFAFTSIZE | This is the size (in words) of the Active File Table (AFT). The size is in words to simplify calculating the size of the available block.                                                                                                                                                                                                                          |
| PXFCBT1-8  | These are the DST numbers of the user (NOCB) control block tables. A DST number of 0 indicates that no data segment is allocated.                                                                                                                                                                                                                                  |
| PXFCOPEN   | This contains the last COPEN error number. Not used by the file system.                                                                                                                                                                                                                                                                                            |
| PXFCTRINFO | This contains information pertinent to the CS trace file. Not used by the file system.                                                                                                                                                                                                                                                                             |
| PXFDOPEN   | This contains the last DOPEN error number. Not used by the file system.                                                                                                                                                                                                                                                                                            |
| PXFDINFO   | Reserved for DS. Not used by the file system.                                                                                                                                                                                                                                                                                                                      |
| PXFFOPEN   | This contains the last FOPEN error number. If it is zero then the last FOPEN completed successfully; otherwise the last FOPEN was unsuccessful and the number is the file system error number.                                                                                                                                                                     |
| PXFKOPEN   | This contains the last KOPEN error number. KSAM is partly imbedded in the file system, and an FOPEN failure on a KSAM file can be caused by a failure to open either the key file or the data file. This error number is used in conjunction with PXFFOPEN to determine which file caused the KSAM open failure. This error number is not used by the file system. |
| PXLEFTOFF  | This is the AFT entry number of the last file/line that completed a no-wait I/O; if zero then no no-wait I/O has been completed. This cell is maintained solely by and for the IOWAIT intrinsic.                                                                                                                                                                   |

|                |                                                                                                                                                                                                                                                                                                                                                                  |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PXFNOCB</b> | This bit signifies that control blocks are not to be created in the PXFILE control block table. This bit is set by the NOCB parameter to the CREATE intrinsic or the :RUN command. This feature permits the user to have as much stack space as possible; otherwise the file system will take several hundred words of stack for the PXFILE control block table. |
| <b>PXFSIZE</b> | This is the size (in words) of the complete PXFILE area. It is the sum of the overhead block, the control block table, the active file table and the available block.                                                                                                                                                                                            |

### 3.1.2 PXFILE Control Block Table (PXFCBT)

Addressing within a PXFILE control block table is somewhat more complicated than addressing an extra data segment CBT since the table does not begin at DB+0. As a result all pointers within the table are table relative; the starting address of the table must be added to a pointer to generate a final DB-relative address. This addressing convention is consistently applied to all control block tables.

When the control block table is expanded, space is taken from the AVAILABLE area. If no space is available then the PXFILE area is expanded and the acquired space is added to the AVAILABLE area.

Refer to section 3.2 for a more detailed description of file control block tables.

|                             |   |                            |  |    |               |
|-----------------------------|---|----------------------------|--|----|---------------|
| 0                           | 1 | 2                          |  | 15 |               |
| -----                       |   |                            |  |    |               |
| Table size in words         |   |                            |  |    | 20 (PXFCBTAB) |
| -----                       |   |                            |  |    |               |
| DST number containing table |   |                            |  |    | 21 PXFDSTX    |
| -----                       |   |                            |  |    |               |
| 0                           |   | Vector table size in words |  |    | 22 PXFVTSIZE  |
| -----                       |   |                            |  |    |               |
| Lock word                   |   |                            |  |    | 23 (PXFLOCK)  |
| -----                       |   |                            |  |    |               |
| Impeded queue               |   |                            |  |    | 24 (PXFQUEUE) |
| -----                       |   |                            |  |    |               |
| Vector table                |   |                            |  |    | 25 PXFVT      |
| -----                       |   |                            |  |    |               |
| Control block area          |   |                            |  |    |               |

The following identifier is also used:

PXFCBTSIZE = PXFILE(16)#, table size in words

Discussion:

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PXFCBTAB   | This is the first word of the control block table; it is used when referring to the entire table.                                                                                                                                                                                                                                                                                                                                   |
| PXFCBTSIZE | This is the size in words of the control block table. It is used principally for calculating the size of the available block.                                                                                                                                                                                                                                                                                                       |
| PXFDSTX    | This is the DST number of the data segment that contains the control block table. This is the same as the DST number of the stack itself. The common convention of referring to the DST number of the stack as zero is not used, because the file system may refer to a PXFILE control block table in another stack, which would result in an ambiguity since that PXFILE control block table would also have a DST number of zero. |
| PXFLOCK    | This is the lock word for the table and has the same format as the lock word for a control block in the table, i. e. lock bit, break bit, lock count, and locking PIN.                                                                                                                                                                                                                                                              |
| PXFQUEUE   | This is the impeded queue for the table and has the same format as the impeded queue for a control block in the table.                                                                                                                                                                                                                                                                                                              |
| PXFVT      | This is the first word of the vector table. It is used when referring to the vector table in general.                                                                                                                                                                                                                                                                                                                               |
| PXFVTSIZE  | This is the size, in words, of the vector table. This is the length of the table and does not reflect the number of entries used or unused.                                                                                                                                                                                                                                                                                         |

### 3.1.3 Available Block

-----

The part labeled Available is used to provide space when the Control Block Table or the Active File Table is expanded. These two tables grow towards each other, and when more space is needed it is simply taken from the Available Block.

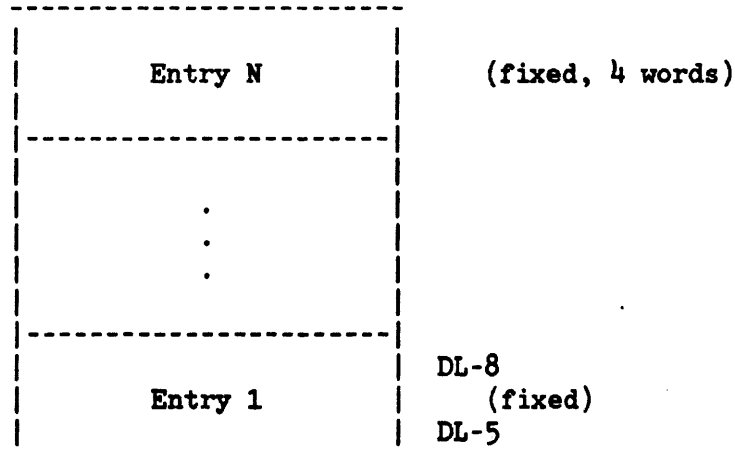
When the Available area is exhausted, the PXFILE area is expanded, the AFT is relocated and the new space is added to the Available Block.

Currently the PXFILE area is only expanded; it is never contracted.

### 3.1.4 Available File Table (AFT) (also called Active File Table.)

The part labeled Available File Table contains information used by the file system (or CS, DS, etc.) to grossly characterize the file access and, most importantly, to give the location of the control blocks.

The overall structure of the AFT is:



where  $N = \text{PXFAFTSIZE}/4$ .

The length of the AFT is specified by PXFAFTSIZE. Unused entries are all zeroes. When the table is full it is expanded by taking space from the Available block.

The AFT is negatively indexed by file number: the entry at DL-8 corresponds to file number 1, the entry at DL-12 corresponds to file number 2, etc.

The structure of a file system AFT entry is:

|                     |   |   |   |   |   |    |          |
|---------------------|---|---|---|---|---|----|----------|
| 0                   | 1 | 2 | 3 | 4 | 5 | 15 |          |
| Entry type   N      |   |   |   |   |   | 0  |          |
| Physical ACB Vector |   |   |   |   |   | 1  | AFTPACBV |
| Logical ACB Vector  |   |   |   |   |   | 2  | AFTLACBV |
| NO-WAIT I/O IOQX    |   |   |   |   |   | 3  | AFTIOQX  |

The entry format depends on the entry type; the file system uses entry type 0.

The following partial word field identifiers are used:

|         |               |             |
|---------|---------------|-------------|
| AFTTYPE | = AFT.(0:4)#, | entry type  |
| AFTNULL | = AFT.(4:1)#, | \$NULL file |

Discussion:

**AFTIOQX** This is the IOQ index of the pending no-wait I/O (if any). This is applicable if the file was opened with the NOWAIT option specified. Also, CS and DS have the same capability and use this cell in a consistent manner. This is because the IOWAIT intrinsic services the file system as well as CS and DS, and is the principal user of this cell. In the case of a message file the accessor's reply port (file system basic IPC port) is stored in this cell. If this cell is zero there is no no-wait I/O pending.

**AFTLACBV** This is the vector of the Logical ACB (LACB) (if any). This is applicable if the file was opened with the multi-access option specified.

**AFTNULL** This bit signifies that the file is \$NULL and that there are no control blocks.

**AFTPACBV** This is the vector of the Physical ACB (PACB). A PACB exists for all files except \$NULL.

**AFTTYPE** This is the AFT entry type number. At present the following entry types are defined:

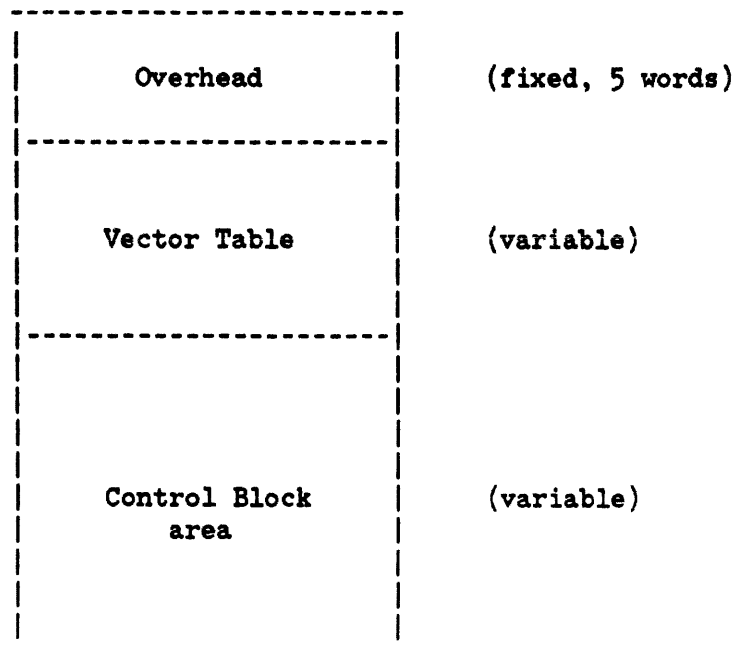
- 0 - file system
- 1 - remote file
- 2 - DS (no-wait I/O disallowed)
- 3 - DS (no-wait I/O allowed)
- 4 - CS
- 5 - CS
- 6 - KSAM
- 7 - 3270
- 8 - Message File

### 3.2 File Control Block Table (CBTAB)

-----

A file control block table can be located in two places: (a) as a sub-part of the PXFILE area, as discussed in section 3.1.2; or (b) in a data segment. Although putting control block tables in PXFILE has the advantage of providing rapid access, it detracts from the space for the user's stack; so the larger control blocks (or optionally, all control blocks) are put into extra data segments. On the other hand, referencing extra data segments may result in an absence trap, which is slow. Extra data segment control block tables are of three kinds: expandable, non-expandable, and shared FCB. Non-expandable CBT's are used for a single PACB with buffers, i. e. where the control block is large, or where the control block can't be local to a single process, i. e., for multi-access. Expandable (or NOBUF) CBT's are used for small control blocks, to wit, LACB's, PACB's with no buffers, and FCB's which are local to a single process. A list of the expandable CBT's associated with a process is kept in the overhead area of PXFILE (cf. section 3.1.1). When a small control block is needed, these CBT's are checked in order to see if one of them has room. Shared FCB CBT's are like expandable CBT's except that they belong to the system rather than to a single process; the system keeps a list of DST's which it has assigned for this purpose.

The overall structure of a control block table is:





### 3.2.1 Overhead

The part labeled Overhead contains information pertaining to the entire table.

|                             |   |   |                            |   |                |
|-----------------------------|---|---|----------------------------|---|----------------|
| 0                           | 1 | 2 | 6                          | 7 | 15             |
| -----                       |   |   |                            |   |                |
| Table size in words         |   |   |                            |   | 0   CBTFSIZE   |
| -----                       |   |   |                            |   |                |
| DST Number containing table |   |   |                            |   | 1   CBTDFSTX   |
| -----                       |   |   |                            |   |                |
| Type                        |   |   | Vector table size in words |   |                |
| -----                       |   |   |                            |   |                |
| Lock word                   |   |   |                            |   | 3   CBTLOCK    |
| -----                       |   |   |                            |   |                |
| Impeded queue               |   |   |                            |   | 4   (CBTQUEUE) |
| -----                       |   |   |                            |   |                |

Other identifiers used:

CBTTYPE    = CBTAB(2).(0:2)#;   control block table type  
CBTFSIZE   = CBTAB(2).(7:9)#;   vector table size

Discussion:

**CBTDFSTX**            This is the DST number of the data segment that contains the control block table. If the table is contained in a stack, i.e. in the PXFILE area, then this is the DST number of the stack and not 0.

**CBTLOCK**            This is the lock word for the table and has the same format as the lock word for a control block in the table, i. e. lock bit, break bit, lock count, and locking PIN. The table is locked, thus insuring exclusive access, whenever a control block is being created or destroyed. It isn't necessary to lock the table while locking a control block within it because control block locking is done pseudo-disabled.

**CBTQUEUE**           This is the impeded queue for the table and has the same format as the impeded queue for a control block in the table. There is no second impeded queue because that facility is used exclusively for BREAK requests against the PACB for \$STDIN/\$STDLIST.

**CBTSIZE** This is the size in words of the table. It is initialized when the table is created and changed when the table is expanded. At present a table is never contracted, even though this is possible.

**CBTTYPE** This field is the type of the control block table. Possible values are:

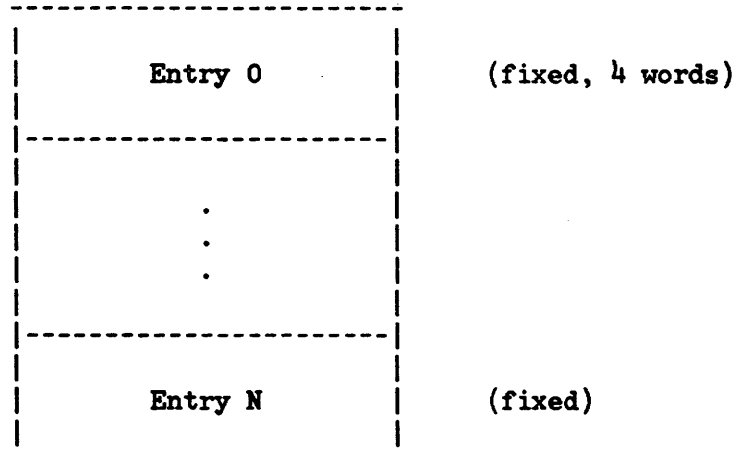
- 0 - stack [PXFILE]
- 1 - NOBUF (expandable)
- 2 - System shared FCB
- 3 - Buffered (contains a single PACB)

**CBTVTSIZE** This is the size, in words, of the vector table area in the control block table. It does not reflect the number of entries used or unused.

### 3.2.2 Vector Table

The part labeled Vector Table contains information used to locate and lock or unlock control blocks in the control block table.

The vector format is found in section 7.3.4 of Chapter 7.  
The overall structure of the vector table is:



where  $N = (CBTVTSIZE/4) - 1$ . Since only six bits are available for a vector table index, the vector table can contain at most 64 entries.

An unused vector table entry will have zeroes in all the words of the entry. A used vector table entry will have a non-zero value in the first word of the entry (the control block address is necessarily non-zero).

The general structure of a vector table entry is:

|                             |  |    |                |
|-----------------------------|--|----|----------------|
| 0                           |  | 15 |                |
| Control block address       |  | 0  | VTADR          |
| Control word                |  | 1  | VTCONTROL      |
| High priority impeded queue |  | 2  | (VTQUEUE)      |
| Low priority impeded queue  |  | 3  | (VTSAVEDQUEUE) |

Discussion:

|              |                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VTADR        | Control block address is the table relative address of the control block associated with the vector table entry. It is a word displacement from the beginning of the control block table.                                                                                                                                                                                                                 |
| VTCONTROL    | The control word is used to coordinate access to the control block. It contains a bit which indicates that the control block is being accessed, and therefore "locked", and a byte which contains the PIN of the process which has exclusive access to the control block. Other processes attempting to access the block will be impeded and queued.                                                      |
| VTQUEUE      | The high priority impeded queue is a byte pair of PINs that are the head and tail of the impeded queue of processes waiting for access to the control block. Processes are impeded and unimpeded by the file system using the normal mechanisms available under MPE.                                                                                                                                      |
| VTSAVEDQUEUE | The low priority impeded queue is a byte pair of PINs and has the same format as VTQUEUE. The only time this word is used is when the control block is in BREAK mode, which can only happen to an ACB corresponding to \$STDIN/\$STDLIST. It is used to save the current VTQUEUE when the control block goes into BREAK mode and to restore VTQUEUE when the control block goes back into non-BREAK mode. |

The last three words of a vector table entry comprise a sub-block for the locking system that is used to coordinate access to a particular control block.

The structure of the vector table entry control sub-block is:

| 0                      | 1 | 2          | 7                      | 8        | 15 |                 |
|------------------------|---|------------|------------------------|----------|----|-----------------|
| -----                  |   |            |                        |          |    |                 |
| L                      | B | Lock count |                        | Lock PIN |    | 0 CBLCONTROL    |
| -----                  |   |            |                        |          |    |                 |
| High priority tail PIN |   |            | High priority head PIN |          |    | 1 CBLQUEUE      |
| -----                  |   |            |                        |          |    |                 |
| Low priority tail PIN  |   |            | Low priority head PIN  |          |    | 2 CBLSAVEDQUEUE |
| -----                  |   |            |                        |          |    |                 |

The following partial word field identifiers are used:

|              |                  |                        |
|--------------|------------------|------------------------|
| CBLLOCK      | = CBL.(0:1)#,    | lock bit               |
| CBLBREAK     | = CBL.(1:1)#,    | break bit              |
| CBLCOUNT     | = CBL.(2:6)#,    | lock count             |
| CBLPIN       | = CBL.(8:8)#,    | PIN holding lock       |
| CBLTAIL      | = CBL(1).(0:8)#, | high priority tail PIN |
| CBLHEAD      | = CBL(1).(8:8)#, | high priority head PIN |
| CBLSAVEDTAIL | = CBL(2).(0:8)#, | low priority tail PIN  |
| CBLSAVEDHEAD | = CBL(2).(8:8)#; | low priority head PIN  |

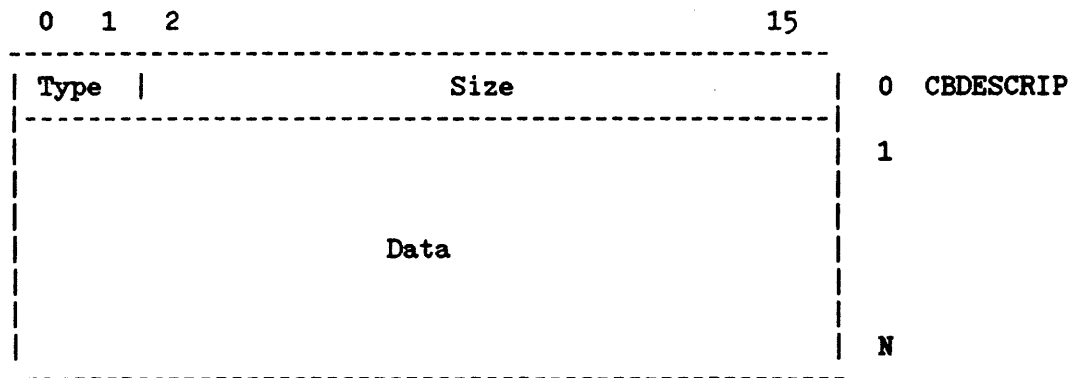
Discussion:

|               |                                                                                                                                                                                     |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CBLBREAK      | This is the BREAK bit and is used only for the ACB corresponding to \$STDIN/\$SDTLIST.                                                                                              |
| CBLCONTROL    | This identifier is used when referring to the first word of the vector table control sub-block.                                                                                     |
| CBLCOUNT      | This is a count of the number of times that the control block is locked by CBLPIN. It is 0 if the control block is not locked and is greater than 0 if the control block is locked. |
| CBLHEAD       | This is the PIN of the process at the head of the high priority impeded queue.                                                                                                      |
| CBLLOCK       | This is the lock bit for a control block; 1 denotes locked.                                                                                                                         |
| CBLPIN        | This is the PIN of the process which has locked the control block and has exclusive access to it. If the control block is not locked then this field is 0.                          |
| CBLQUEUE      | This is the high priority impeded queue.                                                                                                                                            |
| CBLSAVEDHEAD  | This is the PIN of the process at the head of the low priority impeded queue.                                                                                                       |
| CBLSAVEDQUEUE | This is where CBLQUEUE is saved when creating a break queue.                                                                                                                        |
| CBLSAVEDTAIL  | This is the PIN of the process at the tail of the low priority impeded queue.                                                                                                       |
| CBLTAIL       | This is the PIN of the process at the tail of the high priority impeded queue.                                                                                                      |

### 3.2.3 Control Block Area

The part labeled CONTROL BLOCK AREA contains the control blocks used by the file system.

To facilitate storage management, all control blocks have the same overall structure:



where  $N = \text{Size} - 1$ .

Partial word field identifiers are:

|        |               |                        |
|--------|---------------|------------------------|
| CBTYPE | = CB.(0:2)#,  | control block type no. |
| CBSIZE | = CB.(2:14)#; | control block size     |

#### Discussion:

**CBDESCRIP** This is the first word of a control block; the format is common for all control blocks.

**CBSIZE** This is the size (in words) of the control block. The size includes the descriptor word.

**CBTYPE** This is the type number of the control block. There are four types of control blocks:

- 0 - Garbage
- 1 - FCB
- 2 - PACB
- 3 - LACB

When a control block table is created the initial control block area is completely allocated to a single control block of type garbage. When space is requested for a new control block the control block area is scanned (using a first fit algorithm) for a garbage control block that

is as large as the size requested. The space for the new control block is taken from this garbage control block and the space remaining becomes the new garbage control block size.

When space is returned it becomes a new garbage control block. To reduce fragmentation the new garbage control block is combined with either of the two neighboring control blocks if they are of type garbage.

If space is requested and no garbage control block is large enough to contain the new control block then the control block area and control block table are expanded by a sufficient amount. If expansion is not possible, some other control block table must be used.

#### 3.2.4 Access Control Block (ACB)

-----

Virtually every file system intrinsic constructs an ACB as its first action. When using the multi-access option, each accessor shares a single PACB. However each accessor is permitted to view the shared file in a slightly different manner than the other accessors. For example, one accessor may access the file in a read-only mode while the other accessors may access the file in a read-write mode. To do this, each accessor must, during his access, have a slightly different ACB.

The PACB holds information that is global to all accessors of the file. The LACB holds information that is local to each accessor of the file. At the beginning of a particular access, an ACB is constructed by calling LOC'ACB, which copies information from both the LACB and the PACB. At the end of the access, the ACB is released by calling UNLOC'ACB; this updates the PACB and LACB from the ACB since some of the fields may have been modified due to the access. This scheme nearly eliminates EXCHANGEDB's to access the various data segments.

### 3.2.5 Logical Access Control Block (LACB)

All LACBs have the same structure:

| 0                                                      | 1 | 2 | 3                  | 4 | 5 | 6 | 7 | 8                     | 9 | 10 | 11 | 12 | 13 | 14 | 15 |   |
|--------------------------------------------------------|---|---|--------------------|---|---|---|---|-----------------------|---|----|----|----|----|----|----|---|
| 3                                                      |   |   | Complete LACB size |   |   |   |   |                       |   |    |    |    |    |    | 0  |   |
|                                                        |   |   |                    |   |   |   |   | File number           |   |    |    |    |    |    |    | 1 |
| File name - 1st char.                                  |   |   |                    |   |   |   |   | File name - 2nd char. |   |    |    |    |    |    |    | 2 |
| File name - 3rd char.                                  |   |   |                    |   |   |   |   | File name - 4th char. |   |    |    |    |    |    |    | 3 |
| File name - 5th char.                                  |   |   |                    |   |   |   |   | File name - 6th char. |   |    |    |    |    |    |    | 4 |
| File name - 7th char.                                  |   |   |                    |   |   |   |   | File name - 8th char. |   |    |    |    |    |    |    | 5 |
| FOPTIONS                                               |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 6  |   |
| AOPTIONS                                               |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 7  |   |
| Record size in bytes                                   |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 10 |   |
| Block size in words                                    |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 11 |   |
| Reserved for PACBV                                     |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 12 |   |
| Carriage control code                                  |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 13 |   |
| EOF Pg  Ln  St  FK  TC  TB  8B  Car DB   EOF T   EOF M |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 14 |   |
| TE  IC  Q     Terminal stop character                  |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 15 |   |
| Error code                                             |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 16 |   |
| Last I/O transmission log                              |   |   |                    |   |   |   |   |                       |   |    |    |    |    |    | 17 |   |

Partial word field identifiers are:

LACBSIZE = LACB.(2:14)#, size in words  
 LACBSTOPCHAR = LACB(2).(0:8)#, terminal stop character



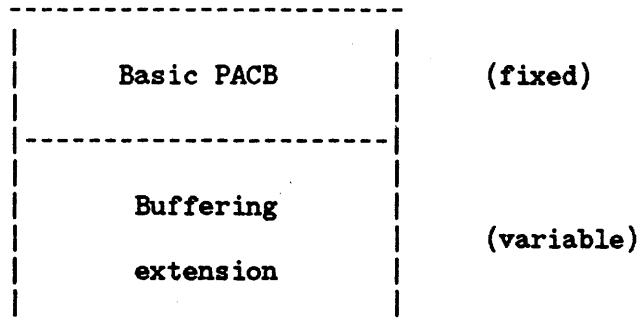
Discussion:

|              |                                                                                      |
|--------------|--------------------------------------------------------------------------------------|
| LACBAOPTIONS | See ACBAOPTIONS.                                                                     |
| LACBBSIZE    | See ACBBSIZE.                                                                        |
| LACBCTL      | See ACBCTL.                                                                          |
| LACBERROR    | See ACBERROR.                                                                        |
| LACBFNUM     | See ACBFNUM.                                                                         |
| LACBFOPTIONS | See ACBFOPTIONS.                                                                     |
| LACBMODE     | See ACBMODE.                                                                         |
| LACBNAME1-8  | See ACBNAME.                                                                         |
| LACBPACB     | This is the vector of the Physical ACB (PACB) for the file.                          |
| LACBRSIZE    | See ACBRSIZE.                                                                        |
| LACBSIZE     | This is the size, in words, of the LACB. All LACBs are sixteen (decimal) words long. |
| LACBSTATE    | See ACBLSTATE.                                                                       |
| LACBSTOPCHAR | See ACBSTOPCHAR.                                                                     |
| LACBTLOG     | See ACBTLOG.                                                                         |

### 3.2.6 Physical Access Control Block (PACB)

---

The overall structure of the PACB is:



The buffering extension is optional; it is present if and only if the file is accessed with buffering. There are thus two possible formats for an ACB:

1. No buffers; the buffering extension is not present.
2. PACB buffers; the buffering extension is present and the buffers are in the buffering extension.

If multiple PACB buffers exist, there will be a buffering extension for each, immediately preceding the buffer. The basic PACB (or NOBUF PACB) is copied into the the ACB as words 0 thru 57 octal; an ACB "extension" is then generated in words 60 thru 67. The resulting ACB thus has the following format:

|                                       |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    |     |  |    |  |       |  |       |  |    |
|---------------------------------------|---|-------------------|---|----|---|----|---|-----------------------|---|----|----|----|----|-------------------------|----|-----|--|----|--|-------|--|-------|--|----|
| 0                                     | 1 | 2                 | 3 | 4  | 5 | 6  | 7 | 8                     | 9 | 10 | 11 | 12 | 13 | 14                      | 15 |     |  |    |  |       |  |       |  |    |
| 2                                     |   | Complete ACB size |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 0   |  |    |  |       |  |       |  |    |
|                                       |   |                   |   |    |   |    |   | File number           |   |    |    |    |    |                         |    | 1   |  |    |  |       |  |       |  |    |
| File name - 1st char.                 |   |                   |   |    |   |    |   | File name - 2nd char. |   |    |    |    |    |                         |    | 2   |  |    |  |       |  |       |  |    |
| File name - 3rd char.                 |   |                   |   |    |   |    |   | File name - 4th char. |   |    |    |    |    |                         |    | 3   |  |    |  |       |  |       |  |    |
| File name - 5th char.                 |   |                   |   |    |   |    |   | File name - 6th char. |   |    |    |    |    |                         |    | 4   |  |    |  |       |  |       |  |    |
| File name - 7th char.                 |   |                   |   |    |   |    |   | File name - 8th char. |   |    |    |    |    |                         |    | 5   |  |    |  |       |  |       |  |    |
| FOPTIONS                              |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 6   |  |    |  |       |  |       |  |    |
| AOPTIONS                              |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 7   |  |    |  |       |  |       |  |    |
| Record size in bytes                  |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 10  |  |    |  |       |  |       |  |    |
| Block size in words                   |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 11  |  |    |  |       |  |       |  |    |
| (Reserved for PACBV, if multi-access) |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 12  |  |    |  |       |  |       |  |    |
| Carriage control code                 |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 13  |  |    |  |       |  |       |  |    |
| EOF                                   |   | Pg                |   | Ln |   | St |   | FK                    |   | TC |    | TB |    | 8B                      |    | Car |  | DB |  | EOF T |  | EOF M |  | 14 |
|                                       |   |                   |   |    |   |    |   | TE                    |   | IC |    | Q  |    | Terminal stop character |    |     |  |    |  |       |  | 15    |  |    |
| Error code                            |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 16  |  |    |  |       |  |       |  |    |
| Last I/O transmission log             |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 17  |  |    |  |       |  |       |  |    |
| File pointer                          |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 20  |  |    |  |       |  |       |  |    |
|                                       |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 21  |  |    |  |       |  |       |  |    |
| Current variable block number         |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 22  |  |    |  |       |  |       |  |    |
|                                       |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 23  |  |    |  |       |  |       |  |    |
| Record transfer count                 |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 24  |  |    |  |       |  |       |  |    |
|                                       |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 25  |  |    |  |       |  |       |  |    |
| Block transfer count                  |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 26  |  |    |  |       |  |       |  |    |
|                                       |   |                   |   |    |   |    |   |                       |   |    |    |    |    |                         |    | 27  |  |    |  |       |  |       |  |    |

|                              |             |                |                 |  |                  |                            |             |  |    |    |
|------------------------------|-------------|----------------|-----------------|--|------------------|----------------------------|-------------|--|----|----|
| Highest block number started |             |                |                 |  |                  |                            |             |  |    | 30 |
|                              |             |                |                 |  |                  |                            |             |  |    | 31 |
| FCB Vector                   |             |                |                 |  |                  |                            |             |  |    | 32 |
| Spare                        |             |                |                 |  |                  |                            |             |  |    | 33 |
| No. input LACB'S             |             |                |                 |  | Total no. LACB'S |                            |             |  |    | 34 |
| Bk                           | Device type |                |                 |  |                  | Last logical I/O status    |             |  |    | 35 |
| AE  RW  ABR NE               | SEOFs       | EOFS           | Blocking factor |  |                  |                            |             |  | 36 |    |
| PF  Hit                      |             | Current buffer |                 |  |                  |                            | No. buffers |  |    | 37 |
| Current record word index    |             |                |                 |  |                  |                            |             |  |    | 40 |
| Buffer size                  |             |                |                 |  |                  |                            |             |  |    | 41 |
| Spare                        |             |                |                 |  |                  |                            |             |  |    | 42 |
| FMAVT index                  |             |                |                 |  |                  |                            |             |  |    | 43 |
| Volume table index           |             |                |                 |  |                  |                            |             |  |    | 44 |
| Name type                    |             |                |                 |  |                  | File disposition           |             |  |    | 45 |
| Access bit map               |             |                |                 |  |                  | Logical device number      |             |  |    | 46 |
| S   M   Q   R   D            |             |                |                 |  |                  | Virtual logical device no. |             |  |    | 47 |
| Spooled device type          |             |                |                 |  |                  | Spooled device record size |             |  |    | 50 |
| Spooled device FOPTIONS      |             |                |                 |  |                  |                            |             |  |    | 51 |
| Spooled device AOPTIONS      |             |                |                 |  |                  |                            |             |  |    | 52 |
| IDD or ODD Index             |             |                |                 |  |                  |                            |             |  |    | 53 |
|                              |             |                |                 |  |                  |                            |             |  |    | 54 |
| No-Wait disk address         |             |                |                 |  |                  |                            |             |  |    | 55 |
|                              |             |                |                 |  |                  |                            |             |  |    | 56 |
| Spare                        |             |                |                 |  |                  |                            |             |  |    | 57 |

|                                        |    |
|----------------------------------------|----|
| PACB DST nr.                           | 60 |
| PACB offset (DST-rel.)                 | 61 |
| LACB DST nr.                           | 62 |
| LACB offset (DST-rel.)                 | 63 |
| ACB offset (Stack-DST-rel.)            | 64 |
| DB offset (Stack-DST-rel.)             | 65 |
| Stack-DST-rel location of PXFILE CBTAB | 66 |
| CBTAB-rel vector table entry address   | 67 |

The following identifiers are used when referring to an ACB:

|               |                      |                             |
|---------------|----------------------|-----------------------------|
| (ACBSIZE)     | = ACB.(2:14)#,       | size in words               |
| ACBFNUM       | = ACB(1).(8:8)#,     | file number                 |
| ACBNAME       | = ACB(2)#,           | file name                   |
| ACBNAME1      | = ACBDBL(1)#,        | file name - first half      |
| ACBNAME2      | = ACBDBL(2)#,        | file name - second half     |
| ACBFOPTIONS   | = ACB(6)#,           | FOPTIONS                    |
| ACBAOPTIONS   | = ACB(7)#,           | AOPTIONS                    |
| ACBRSIZE      | = ACB(8)#,           | record size (bytes)         |
| ACBBSIZE      | = ACB(9)#,           | block size (words)          |
| ACBCTL        | = ACB(11)#,          | carriage control word       |
| ACBLSTATE     | = ACB(12)#,          | local state flags           |
| ACBEOF        | = ACBLSTATE.(1:1)#,  | end of file sensed          |
| ACBLPCTL      | = ACBLSTATE.(2:2)#,  | page and line control       |
| ACBPAGECTL    | = ACBLSTATE.(2:1)#,  | page control                |
| ACBLINECTL    | = ACBLSTATE.(3:1)#,  | line control                |
| ACBSTREAM     | = ACBLSTATE.(4:1)#,  | stream I/O                  |
| ACBFKEYS      | = ACBLSTATE.(5:1)#,  | restore function keys       |
| ACBXMITCRLF   | = ACBLSTATE.(6:1)#,  | transmit CR,LF to user      |
| ACBTBLOCK     | = ACBLSTATE.(7:1)#,  | disable block mode          |
| ACBBINARYIO   | = ACBLSTATE.(8:1)#,  | 8-bit terminal transfers    |
| ACBCARRIAGE   | = ACBLSTATE.(9:1)#,  | carriage control flag       |
| (ACBDEFBLOCK) | = ACBLSTATE.(10:1)#, | default blocking            |
| ACBREADCODE   | = ACBLSTATE.(11:4)#, | input EOF check             |
| ACBREADTYPE   | = ACBLSTATE.(11:2)#, | input EOF type              |
| ACBREADMODE   | = ACBLSTATE.(13:2)#, | input EOF mode              |
| ACBMODW       | = ACB(13)#,          | mode word                   |
| ACBMODE       | = ACBMODW.(0:8)#,    | mode setting                |
| ACBTAPEERROR  | = ACBMODW.(4:1)#,    | report recovered tape error |
| ACBINHIBCRLF  | = ACBMODW.(5:1)#,    | inhibit terminal CR/LF      |

|               |                     |                               |
|---------------|---------------------|-------------------------------|
| ACBQUIESCE    | = ACBMODW.(6:1)#,   | critical output verify        |
| ACBSTOPCHAR   | = ACBMODW.(8:8)#,   | terminal stop character       |
| ACBERROR      | = ACB(14)#,         | error code                    |
| ACBTLOG       | = ACB(15)#,         | last I/O transmission log     |
| ACBFPTR       | = ACBDBL(08)#,      | current record number         |
| ACBBLK        | = ACBDBL(09)#,      | current variable block        |
| ACBRTFRCT     | = ACBDBL(10)#,      | logical record tfr count      |
| ACBETFRCT     | = ACBDBL(11)#,      | block transfer count          |
| ACBHIBLK      | = ACBDBL(12)#,      | highest block started         |
| ACBFCB        | = ACB(26)#,         | FCB vector                    |
|               |                     |                               |
| ACBSHCNTS     | = ACB(28)#,         | LACB counts                   |
| ACBSHCNTIN    | = ACBSHCNTS.(0:8)#, | # of Read LACB'S              |
| ACBSHCNT      | = ACBSHCNTS.(8:8)#, | # of LACB'S                   |
| ACBSTATW      | = ACB(29)#,         | access class, status, etc.    |
| ACBBREAK      | = ACBSTATW.(1:1)#,  | break (\$STDIN/LIST only)     |
| ACBDTYPE      | = ACBSTATW.(2:6)#,  | device type                   |
| ACBACCCL      | = ACBSTATW.(2:3)#,  | device access class           |
| ACBSUBCL      | = ACBSTATW.(5:3)#,  | device sub-class              |
| ACBSTATUS     | = ACBSTATW.(8:8)#,  | last logical I/O status       |
| ACBQSTATUS    | = ACBSTATW.(8:5)#,  | qualifying status part        |
| ACBGSTATUS    | = ACBSTATW.(13:3)#, | general status part           |
| ACBGSTW       | = ACB(30)#,         | global state flags            |
| ACBNOWAITEOF  | = ACBGSTW.(0:1)#,   | EOF advanced?                 |
| ACBNOWAITMODE | = ACBGSTW.(1:1)#,   | last I/O: 0 = read, 1 = write |
| ACBABORTREAD  | = ACBGSTW.(2:1)#,   | abort broken re-read?         |
| ACBNEWEOF     | = ACBGSTW.(3:1)#,   | EOF advanced - tape file      |
| ACBSAVEEOF    | = ACBGSTW.(4:2)#,   | for saving ACBEOFS            |
| ACBEOFS       | = ACBGSTW.(6:2)#,   | EOF flags - :EOD/:            |
| ACBBLKFACT    | = ACBGSTW.(8:8)#,   | records/block                 |
| ACBBUF        | = ACB(31)#,         | buffer data & misc. flags     |
| ACBPRIV       | = ACBBUF.(0:1)#,    | privileged access only        |
| ACBHIT        | = ACBBUF.(1:1)#,    | buffer hit flag               |
| ACBCURRBUF    | = ACBBUF.(4:4)#,    | current buffer nr.            |
| ACBNUMBUFS    | = ACBBUF.(12:4)#,   | number of buffers less 1      |
| ACBBUFUSED    | = ACB(32)#,         | used block word count         |
| ACBBUFSIZE    | = ACB(33)#,         | buffer size (words)           |
| ACBXXXX       | = ACB(34)#,         | spare                         |
| ACBFMAVTX     | = ACB(35)#,         | FMAVT index                   |
| ACBVDADDR     | = ACB(36)#,         | volume table index            |
| ACBDNTD       | = ACB(37)#,         | type & disposition            |
| ACBDNTYPE     | = ACBDNTD.(0:8)#,   | name type for dir. search     |
| ACBDISP       | = ACBDNTD.(8:8)#,   | file disposition              |
| ACBAMLD       | = ACB(38)#,         | access mask & LDEV            |
| ACBACCESS     | = ACBAMLD.(0:8)#,   | access mask                   |
| ACBDADDR      | = ACBAMLD.(8:8)#,   | logical device number         |
|               |                     |                               |
| ACBSPFL       | = ACB(39)#,         | spool control flags           |
| ACBSPOOLED    | = ACBSPFL.(0:1)#,   | spooled device flag           |
| ACBSPOOLIO    | = ACBSPFL.(0:2)#,   | spooled IN/OUT                |
| ACBSPSQ       | = ACBSPFL.(2:2)#,   | squeeze flags                 |
| ACBSPSQZ      | = ACBSPFL.(2:1)#,   | file squeezed                 |
| ACBSPRSQ      | = ACBSPFL.(3:1)#,   | request to sqz                |
| ACBSPDSQ      | = ACBSPFL.(4:1)#,   | squeeze just done             |

|               |                      |                          |
|---------------|----------------------|--------------------------|
| ACBSPVDEV     | = ACBSPFL.(8:8)#,    | spooled virtual device   |
| ACBSPTYRC     | = ACB(40)#,          | spooled dev type/recsize |
| ACBSPTYPE     | = ACBSPTYRC.(0:6)#,  | spooled dev type         |
| ACBSPREC      | = ACBSPTYRC.(6:10)#, | spooled dev rec size     |
| ACBSPFOPT     | = ACB(41)#,          | spooled dev FOPTIONS     |
| ACBSPAOPT     | = ACB(42)#,          | spooled dev AOPTIONS     |
| ACBSPXDDX     | = ACB(43)#,          | IDD/ODD index            |
| ACBNOWAITDA   | = ACBDBL(22)#,       | No-wait disk address     |
| ACBNOWAITLDEV | = ACB(27)#,          |                          |

#### Discussion:

**ACBABORTREAD** This flag is used to abort a broken terminal re-read. The flag is set via the ABORT parameter to FUNBREAK. If the flag is set then the READ PENDING message will be aborted along with the re-read. This feature is needed to handle the BREAK...:ABORT, etc. situation.

**ACBACCCL** This is the access class part of the device type number. The following are legal values:

- 0 - direct (e.g. disc)
- 1 - serial input (e.g. card reader)
- 2 - parallel input/output (e.g. terminal)
- 3 - serial input/output (e.g. mag tape)
- 4 - serial output (e.g. line printer)

**ACBACCESS** This is the access bit map for the file. The following are the bit definitions of this eight-bit field:

- (0:1) - unused
- (1:1) - unused
- (2:1) - read
- (3:1) - append
- (4:1) - write
- (5:1) - lock
- (6:1) - execute
- (7:1) - save

This access security is determined by the ACCCHECK intrinsic and enforced by the file system.

**ACBAOPTIONS** This is the AOPTIONS in effect for this file access.

**ACBBINARYIO** This bit controls full eight bit transfers on the 2644 page mode terminal. It is adjusted by FCONTROL(26) and FCONTROL(27).

**ACBBLK** This is the block number of the current variable record format block. Applicable iff the record format is variable.

|             |                                                                                                                                                                                                                                                                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACBBLKFACT  | This is the blocking factor for the file. It is the number of records in a block. Legal values range from 1 to 255.                                                                                                                                                                                                               |
| ACBBREAK    | This is the break mode flag. It is applicable iff the ACB is for \$STDIN or \$STDLIST. If set it means that the BREAK key has been hit and that the CI should have high priority access to the ACB. The flag will be cleared when a RESUME or ABORT is issued.                                                                    |
| ACBBSIZE    | This is the block size, in words, of the file.                                                                                                                                                                                                                                                                                    |
| ACBBTFRCT   | This is the total number of blocks transferred to and from the file. The initial value is 0D.                                                                                                                                                                                                                                     |
| ACBBUFUSED  | This is the word index, relative to the base of the block, for the selected record within the block. This is applicable iff the file access is buffered.                                                                                                                                                                          |
| ACBCARRIAGE | This bit signifies that the file has carriage control. It is the same as the carriage control bit in ACBFOPTIONS if the file is spooled. If not spooled, the bit is zero, and IOMOVE will pass the FWRITE carriage control parameter directly to the driver rather than imbedding it as the first character of the output record. |
| ACBCTL      | This is the CONTROL parameter from the last FWRITE. This value is pertinent iff the file was opened with carriage control.                                                                                                                                                                                                        |
| ACBCURRBUF  | This is the buffer number (0-relative) containing the most recently referenced record. Applicable iff the file access is buffered.                                                                                                                                                                                                |
| ACBDADDR    | This is the logical device number of the file. For a disc file this is the logical device number of the first extent.                                                                                                                                                                                                             |
| ACBDEFBLOCK | This bit signifies that the file is to be accessed with default blocking. The bit is initialized from the FOPEN stateword STATE. It does not need to be in the ACB; it is mentioned here only to signify that the bit is effectively used due to the way ACBLSTATE is initialized from STATE.                                     |
| ACBDISP     | This is the file close disposition derived from the FOPEN call. The only way this can be specified is via a file equation. The legal values are the same as those for FCLOSE.                                                                                                                                                     |



ACBDNTYPE        This is the file reference format type number and is derived from the FOPEN call. The following are legal values:

- 0 - full name
- 1 - account name absent
- 2 - group and account name absent
- 3 - null name

This information is needed by FRENAME.

ACBDTYPE        This is the device type number of the file. The following are legal values (octal):

- 0 - moving head disc
- 1 - fixed head disc
- 7 - foreign disc
- 10 - card reader
- 11 - paper tape reader
- 20 - terminal
- 24 - card reader/interpreter/punch
- 26 - SSLC
- 27 - programmable controller
- 30 - magnetic tape
- 31 - serial disc
- 40 - line printer
- 41 - card punch
- 42 - paper tape punch
- 43 - CALCOMP 500 plotter
- 44 - CALCOMP 600 plotter
- 45 - CALCOMP 700 plotter

ACBEOF          This bit is set when EOF has been sensed.

ACBEOFS        This is the type of EOF detected on \$STDIN(X). This field consists of two bits:

- (0:1) - super colon (i.e. EOF for \$STDINX)
- (1:1) - regular colon (i.e. EOF for \$STDIN)

Applicable for multi-access to \$STDIN(X) only.

ACBERROR       This is the error number for the file. It is used by all intrinsics except FOPEN. When an error is detected the error number is placed in this cell. The error number is cleared at the beginning of each callable intrinsic except FCHECK (which reads it).

ACBFCB          This is the FCB vector for the file. Applicable only to disc files.

|              |                                                                                                                                                                                                                                                                                                 |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACBFKEYS     | This bit controls the definition of the f1 and f2 function keys on the 2644 page mode terminal; it is adjusted by FCONTROL(32) and FCONTROL(33). (Obsolete function)                                                                                                                            |
| ACBFNUM      | File number, range from 1 to 255. Used mostly for calling routines that access things such as labels by file number.                                                                                                                                                                            |
| ACBFOPTIONS  | This is the FOPTIONS in effect for this file access.                                                                                                                                                                                                                                            |
| ACBFPTR      | This is the sequential access record pointer; it contains the next sequential record number. The initial value is 0D. This value is used only by the FREAD, FWRITE and FUPDATE intrinsics. However the value is maintained by all data transferring file system intrinsics.                     |
| ACBFMAVTX    | This is the entry index into the file multi-access vector table (FMAVT). This is valid iff the file access is multi-access.                                                                                                                                                                     |
| ACBGSTATE    | These are miscellaneous state flags. These are "global" in nature in that they are the same for all accessors in a multi-access environment. The constituent bits are described individually.                                                                                                   |
| ACBGSTATUS   | This is the general part of the last I/O status for the file. The following are the legal values: <ul style="list-style-type: none"> <li>0 - pending</li> <li>1 - successful</li> <li>2 - end of file</li> <li>3 - unusual condition</li> <li>4 - irrecoverable error</li> </ul>                |
| ACBHIBLK     | This is the highest block number for which an anticipatory read has been issued, and is applicable iff the file access is buffered. The initial value is -1D.                                                                                                                                   |
| ACBHIT       | This is the buffer hit flag. If set it indicates that the last read or write request was serviced without any physical I/O required. This flag is used only for performance measurement. The code which manipulates it is optional to the file system, and is controlled by compiler toggle X3. |
| ACBINHIBCRLF | This bit controls the termination of lines written to the terminal. If not set then each line is terminated with a CR and LF; if set then no line termination characters are used. This bit is valid iff the file is a terminal file; it is adjusted by FSETMODE.                               |

|               |                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACBLINECTL    | This is the line control bit. If not set then each line is post-spaced; if set then each line is pre-spaced. This bit is used by line printers and terminals only. It is adjusted by FCONTROL(1) and FWRITE with the appropriate carriage control.                                                                                                                                                       |
| ACBLPCTL      | This are the line and page control bits, which are described separately.                                                                                                                                                                                                                                                                                                                                 |
| ACBLSTATE     | These are miscellaneous state flags. They are "local" in nature in that they may be different for each accessor in a multi-access environment. Bits (9:6) are initialized from the stateword local variable called STATE in FOPEN; the ten remaining bits are initialized individually. The constituent bits are described individually.                                                                 |
| ACBMODE       | These are miscellaneous mode flags. The constituent bits are described individually.                                                                                                                                                                                                                                                                                                                     |
| ACBNAME       | This is the local file name. The name is eight bytes in length with trailing blanks added.                                                                                                                                                                                                                                                                                                               |
| ACBNEWEOF     | This flag when set indicates that a new tape mark should be written before the tape is rewound or backspaced. Applicable only to mag tape files.                                                                                                                                                                                                                                                         |
| ACBNOWAITEOF  | This bit is used to save the value of the local EOF advanced flag NEWEOF in IOMOVE between the I/O initiation and I/O completion calls. This flag is applicable iff the file is accessed in no-wait I/O mode.                                                                                                                                                                                            |
| ACBNOWAITMODE | This cell is used to save the I/O mode between no-wait I/O initiation and completion calls. If the bit is set then the last I/O request was a write; otherwise it was a read. This cell is pertinent iff the file is accessed in no-wait I/O mode.                                                                                                                                                       |
| ACBNUMBUFS    | This is the number of buffers, less one, used for the file access. Applicable iff the file access is buffered.                                                                                                                                                                                                                                                                                           |
| ACBPAGECTL    | This is the page control bit. If not set then a page is assumed to consist of 60 lines (auto page eject); if set then a page is assumed to consist of 66 lines (no auto page eject). This is used primarily for line printers but is also valid for terminals; these are the only devices for which this is valid. This bit is adjusted by FCONTROL(1) and FWRITE with the appropriate carriage control. |

|             |                                                                                                                                                                                                  |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACBPRIV     | This flag when set indicates that the file is privileged in that it has a negative file code; the user must be in privileged mode to access it.                                                  |
| ACBQSTATUS  | This is the qualifying part of the last I/O status for the file. The values are unique for each general status part. See I/O System IMS for all legal values.                                    |
| ACBQUIESCE  | This bit controls critical output verification. If set, buffered output is guaranteed to have been written to the device when control is returned to the user. This bit is adjusted by FSETMODE. |
| ACBREADCODE | This field consists of the input EOF checking type and mode, and is used to generate the P1 parameter to ATTACHIO. These fields are described individually.                                      |
| ACBREADMODE | This field controls the input EOF checking mode. It is 00 for reading \$STDIN, 01 for reading \$STDINX, and 10 for the command interpreter.                                                      |
| ACBREADTYPE | This field controls the input EOF checking type. It is 01 for JOBS, 10 for SESSIONs, and 00 for DATA.                                                                                            |
| ACBRSIZE    | This is the file's record size in positive bytes.                                                                                                                                                |
| ACBRTFRCT   | This is the total number of records transferred to and from the file. The initial value is 0D.                                                                                                   |
| ACBSAVEEOFS | This field is used to save the contents of ACBEOFS during BREAK mode processing.                                                                                                                 |
| ACBSHCNT    | This is the total number of LACBs that exist for this PACB. Valid iff the file access is multi-access.                                                                                           |
| ACBSHCNTIN  | This is the total number of input-only LACBs that exist for this PACB. Valid iff the file access is multi-access.                                                                                |
| ACBSHCNTS   | This is the total LACB and total input-only LACB counts, each of which is described separately.                                                                                                  |
| ACBSIZE     | This is the size, in words, of the complete ACB. It includes the buffering extension, if present.                                                                                                |
| ACBSPAOPT   | This is the AOPTIONS for the spooled device. Applicable iff the file access is to a spooled device.                                                                                              |
| ACBSPFOPT   | This is the FOPTIONS for the spooled device. Applicable iff the file access is to a spooled device.                                                                                              |

|             |                                                                                                                                                                                                                                                                               |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACBSPOOLED  | This is the spooled device flag. If set then the file access is to a spooled device.                                                                                                                                                                                          |
| ACBSPPOOLIO | This field is a combination of the spooled device flag and the input/output mode of the spooled device. Legal values are: <ul style="list-style-type: none"> <li>00 - not spooled</li> <li>01 - illegal</li> <li>10 - input spooling</li> <li>11 - output spooling</li> </ul> |
| ACBSPREC    | This is the record size, in bytes, of the spooled device. Applicable iff the file access is to a spooled device.                                                                                                                                                              |
| ACBSPTYPE   | This is the device type (from the LDT) of the spooled device. Applicable iff the file access is to a spooled device.                                                                                                                                                          |
| ACBSPTYRC   | This cell contains the spooled device type and record size, which are described separately.                                                                                                                                                                                   |
| ACBSPVDEV   | This is the logical device number of the spooled device. Applicable iff the file access is to a spooled device.                                                                                                                                                               |
| ACBSPXDDX   | This is the index into the IDD or ODD for a spoolfile. Applicable iff the file access is to either a spooled device or a spoolfile.                                                                                                                                           |
| ACBSTATUS   | This is the last I/O status for the file. It comes from the I/O status part of the IOCB returned by ATTACHIO. Not all ATTACHIO calls update this cell.                                                                                                                        |
| ACBSTOPCHAR | This is the record termination character used for terminal reads. This character can be changed via FCONTROL(25).                                                                                                                                                             |
| ACBSTREAM   | This bit signifies inter-block garbage for disc files. If set, the block size is a multiple of 128 words and therefore there is no garbage data between blocks. This fact is used to improve multi-record I/O by mapping the request into as few ATTACHIOs as possible.       |

**ACBSUBCL**

This is the sub-class part of the device type number. The sub-class is unique for each access class. The following are the legal sub-class values for each device class:

- 0 - direct
  - 0 - moving head disc
  - 1 - fixed head disc
  - 7 - foreign disc
- 1 - serial input
  - 0 - card reader
  - 1 - paper tape reader
- 2 - parallel input/output
  - 0 - terminal
  - 4 - card reader/punch
  - 6 - SSLC
  - 7 - programmable controller
- 3 - serial input/output
  - 0 - mag tape
  - 7 - serial disc
- 4 - serial output
  - 0 - line printer
  - 1 - card punch
  - 2 - paper tape punch
  - 3 - CALCOMP 500 plotter
  - 4 - CALCOMP 600 plotter
  - 5 - CALCOMP 700 plotter

**ACBTAPEERROR**

This bit controls the reporting of recovered mag tape errors. If not set the recovered errors are not reported to the user; if set then recovered errors are reported to the user by returning CCL and error number 39. Valid iff the file is a mag tape file. This bit is adjusted by FSETMODE.

**ACBTBLOCK**

This bit controls block mode transfers on the 2644 page mode terminal. This bit is adjusted by FCONTROL(28) and FCONTROL(29).

**ACBTLOG**

This is the last I/O transmission log for the file. It comes from the I/O transmission log part of the IOCB returned by ATTACHIO. Not all ATTACHIO calls update this cell.

**ACBVDADDR**

This is the volume table index for the file. Applicable iff the file is a disc file.

**ACBXMITCRLF**

This bit controls CR and LF insertion into the user buffer on the 2644 page mode terminal. This bit is adjusted by FCONTROL(30) and FCONTROL(31).

If present, the PACB buffering extension contains from one to sixteen block buffers each having the following format:

|                         |   |   |   |   |   |    |    |    |    |             |
|-------------------------|---|---|---|---|---|----|----|----|----|-------------|
| 0                       | 1 | 2 | 6 | 7 | 8 | 12 | 13 | 14 | 15 |             |
| IOQ entry index         |   |   |   |   |   |    |    |    |    | 0 BLKIOQX   |
|                         |   |   |   |   |   |    |    |    |    | 1 BLKFLAGW  |
|                         |   |   |   |   |   |    |    |    |    | 2 BLKLSTAT  |
| IOCB - Status           |   |   |   |   |   |    |    |    |    | 3 BLKTLOG   |
| IOCB - Transmission log |   |   |   |   |   |    |    |    |    | 4 BLKBLOCK  |
| Block number            |   |   |   |   |   |    |    |    |    | 5           |
| Block log. device no.   |   |   |   |   |   |    |    |    |    | 6 BLKDADDR  |
| Block sector number     |   |   |   |   |   |    |    |    |    | 7           |
| Buffer                  |   |   |   |   |   |    |    |    |    | 8 BLKBUFFER |

#### Other identifiers used:

|           |                   |                             |
|-----------|-------------------|-----------------------------|
| BLKIOCB   | = BLKDBL(1)#,     | IOCB                        |
| (BLKLDEV) | = BLK(6).(0:8)#,  | block logical device number |
| BLKFLAGS  | = BLK(1).(13:3)#, | block I/O flags             |
| BLKIOOUT  | = BLK(1).(13:1)#, | last I/O was write?         |
| BLKDIRTY  | = BLK(1).(14:1)#, | buffer modified?            |
| BLKIOPEND | = BLK(1).(15:1)#, | I/O in progress?            |
| BLKIOCOMP | = BLK(1).(14:2)#, | I/O complete - not dirty    |

#### Discussion:

**BLKBLOCK** This is the block number of the data contained in the buffer. A value of -1D indicates that the buffer is empty.

**BLKBUFFER** If ACB buffering is used, this is the buffer location. When system buffers were used, the buffer location was given by BLKSYSBUFEX and BLKSYSBUFDISP.

**BLKDADDR** This is the block's logical device and sector number.

|           |                                                                                                                                                                                                                                                                              |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BLKDIRTY  | This flag is set if the contents of the buffer has been modified. When the block buffer is reused this flag is checked to see if the block needs to be written to the device.                                                                                                |
| BLKFLAGS  | These are the miscellaneous flags associated with the block, which are described separately.                                                                                                                                                                                 |
| BLKIOCB   | This is the IOCB returned by the I/O system when the block I/O has completed. On a blocked I/O request this is obtained from the ATTACHIO call; on an unblocked I/O request this is obtained from WAITFORIO.                                                                 |
| BLKIOCOMP | This is the buffer modified flag (BLKDIRTY) and the I/O in progress flag (BLKIOPEND), which are described separately. This field is usually interrogated to see if it contains the value 2, which means that the buffer has been modified but not yet written to the device. |
| BLKIOOUT  | This is the mode of the I/O operation for the block. It is set by a write and cleared by a read.                                                                                                                                                                             |
| BLKIOPEND | This is the I/O in progress flag. It is set if the I/O is pending; it is cleared when the I/O has completed.                                                                                                                                                                 |
| BLKIOQX   | This is the IOQ index of the unblocked I/O request for the block. It is used as the argument to WAITFORIO, which insures the completion of the I/O request.                                                                                                                  |
| BLKLDEV   | This is the logical device number of the block.                                                                                                                                                                                                                              |
| BLKLSTAT  | The I/O status part of the IOCB consists of the PCB number and the error code for the completed I/O request.                                                                                                                                                                 |
| BLKTLOG   | The transmission log part of the IOCB is the number of words or bytes transferred by the the I/O request.                                                                                                                                                                    |



### 3.2.7 File Control Block (FCB)

The FCB coordinates access to a file on a sharable device. At present the only sharable device is a disc, so only disc files have FCBs.

The information contained in an FCB is derived from the file label. The FCB is used to hold this information, rather than the file label, since it can be accessed more quickly.

The FCB can be contained in a stack when first created. If another process opens the file, the FCB will be moved to a system data segment (which will be created if it doesn't already exist) so that the first process' entire stack need not be present when the second process is dealing with the file. The number of a data segment containing a list of numbers of shared file system data segments is kept in system global location 1076 octal. The size of the FCB depends on the maximum number of extents specified at FOPEN; there are 44 (octal) words plus two per extent. There will be at least one extent, since the file label always exists in the first extent. The FCB extent map is in terms of logical device and sector number. The extent map in the file label is in terms of volume rather than logical device; the map is converted by VTABTOLDEV when the label is read, and converted back by LDEVTOVTAB when the label is written to disk.

The FCB has the following format:

| 0                    | 1         | 2                 | 3 | 7 | 8 | 12                     | 13 | 14             | 15 |                |   |
|----------------------|-----------|-------------------|---|---|---|------------------------|----|----------------|----|----------------|---|
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| 1                    |           | Complete FCB size |   |   |   |                        |    |                |    | 0              |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| New FCB vector       |           |                   |   |   |   |                        |    |                |    | 1 FCBNEWFCBV   |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| FOPTIONS             |           |                   |   |   |   |                        |    |                |    | 2 FCBFOPTIONS  |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| Device specification |           |                   |   |   |   |                        |    |                |    | 3 FCBDEVICE    |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| Prev. lock           | Dev. type |                   |   |   |   |                        |    | Device subtype | 4  |                |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| No. opens for output |           |                   |   |   |   | No. opens for any mode |    |                |    |                | 5 |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| Creator ACB vector   |           |                   |   |   |   |                        |    |                |    | 6 FCBACB       |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| RIN number           |           |                   |   |   |   |                        |    |                |    | 7 FCBRIN       |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |
| Exclusive status     |           |                   |   |   |   |                        |    |                |    | 10 FCBEXCLSTAT |   |
| -----                |           |                   |   |   |   |                        |    |                |    |                |   |

|                                                  |    |                     |
|--------------------------------------------------|----|---------------------|
| Private volume information                       | 11 | FCBPVINFO           |
| File limit                                       | 12 | FCBFLIM             |
|                                                  | 13 |                     |
| Reserved for IMAGE                               | 14 | FCBIMAGE            |
|                                                  | 15 |                     |
| End of data pointer                              | 16 | FCBEOF              |
|                                                  | 17 |                     |
| No. user labels written   No. user labels avail. | 20 | FCBUSERLBL          |
| Extent size in sectors                           | 21 | FCBEXTSIZE          |
| Blocking factor   Sectors per block              | 22 |                     |
| Sector offset to data   Disp   No. extents - 1   | 23 |                     |
| Last extent size in sectors                      | 24 | FCBLASTEXT-<br>SIZE |
| No. opens input mode                             | 25 |                     |
| Group name - 1st char.   Group name - 2nd char.  | 26 | FCBGN               |
| Group name - 3rd char.   Group name - 4th char.  | 27 |                     |
| Group name - 5th char.   Group name - 6th char.  | 30 |                     |
| Group name - 7th char.   Group name - 8th char.  | 31 |                     |
| Acct name - 1st char.   Acct name - 2nd char.    | 32 | FCBAN               |
| Acct name - 3rd char.   Acct name - 4th char.    | 33 |                     |
| Acct name - 5th char.   Acct name - 6th char.    | 34 |                     |
| Acct name - 7th char.   Acct name - 8th char.    | 35 |                     |
| Start of file block number                       | 36 | FCBSTART            |
|                                                  | 37 |                     |
| Current number of data blocks in the file        | 40 | FCBEND              |
|                                                  | 41 |                     |

|                                                 |    |                       |
|-------------------------------------------------|----|-----------------------|
| Number of open and close records (message file) | 42 | FCBNUMOPEN-<br>CLSREC |
|                                                 | 43 |                       |
| Logical device number                           | 44 | FCBEXTMAP             |
| First extent sector number                      | 45 |                       |
| .                                               |    |                       |
| .                                               |    |                       |
| .                                               |    |                       |
| Logical device number                           |    |                       |
| Last extent sector number                       |    |                       |

Other identifiers used:

|             |                    |                        |
|-------------|--------------------|------------------------|
| FCBSIZE     | = FCB.(2:14)#,     | size in words          |
| FCBLKST     | = FCB(4).(0:2)#,   | previous lock state    |
| FCBDTYPE    | = FCB(4).(2:6)#,   | device type            |
| FCBSUBTYPE  | = FCB(4).(12:4)#,  | device subtype         |
| FCBOCNTOUT  | = FCB(5).(0:8)#,   | no. accessors - output |
| FCBOCNT     | = FCB(5).(8:8)#,   | no. accessors          |
| FCBLBLEOF   | = FCB(16).(0:8)#,  | no. labels written     |
| FCLBL       | = FCB(16).(8:8)#,  | no. labels available   |
| FCBBLKFACT  | = FCB(18).(0:8)#,  | blocking factor        |
| FCBSECTPBLK | = FCB(18).(8:8)#,  | sectors per block      |
| FCBSECTOFF  | = FCB(19).(0:8)#,  | sector offset to data  |
| FCBDISP     | = FCB(19).(8:3)#,  | pending disposition    |
| FCBNUMEXTS  | = FCB(19).(11:5)#, | no. extents less 1     |
| FCBOCNTIN   | = FCB(21).(8:8)#,  | no. accessors - input  |
| FCBLABEL    | = FCDBL(18)#,      | label LDEV and sector  |
| FCBLDEV     | = FCB(36).(0:8)#,  | label LDEV             |

Discussion:

**FCBACB** This is the vector of the ACB that was created at the same time as the FCB. This is used in conjunction with FCBNEWFCBV when relocating the FCB.

**FCBAN** This is the account name of the file. It is eight bytes in length with trailing blanks added.

**FCBBLKFACT** This is the blocking factor of the file. It is the number of logical records in a physical block. Legal values range from 1 to 255.

**FCBDEVICE** This specifies the device on which the file resides. If it is positive then it represents a logical device number; if negative it represents a (negative) device class index.

**FCBDISP** This is the pending FCLOSE disposition for the file. Legal values are:

domain disposition

0 - no change

1 - save permanent

2 - save temporary and rewind

3 - save temporary but do not rewind

4 - release

7 - invalid file (file label access error)

**FCBDTYPE** This is the device type number of the first extent of the file. See ACBDTYPE for a list of legal values.

**FCBEND** Block number of the file's EOF, relative to FCBSTART.

**FCBEOF** This is the end-of-file pointer for the file. It is a double integer representing the number of records in the file. It can also be viewed as the record number of the next record past EOF.

**FCBEXCLSTAT** This is the exclusive status of the file access. If -1 then the file is being accessed exclusively; otherwise it is the number of semi-exclusive accessors.

**FCBEXTMAP** This is the extent map of the file. The number of extents is specified by FCBNUMEXTS; a 0D extent descriptor indicates that the extent has not been allocated.

**FCBEXTSIZE** This is the extent size, in sectors, of the file. All extents in the file except possibly the last have this size. This is a logical value, and legal values range from 1 to 65535 sectors. This restricts the maximum file size to 2097120 sectors (268,431,360 words).

**FCBFLIM** This is the end-of-space pointer for the file. It is a double word integer representing the maximum number of records (fixed length record format) or blocks (undefined or variable length record format) in the file.

**FCBFOPTIONS** This is the FOPTIONS in effect for the file.

**FCBGN** This is the group name of the file. It is eight bytes long with trailing blanks added.

|                  |                                                                                                                                                                                                                                                                                                  |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCBLABEL         | This is the logical device and sector number of the file label, which is the same as the first extent descriptor.                                                                                                                                                                                |
| FCBLASTTEXTSIZE  | This is the size, in sectors, of the last extent in the file. If the file has one extent then this is the same as FCBEXTSIZE; otherwise this value may be different from FCBEXTSIZE. This is the size of the last physical extent for the file; it is not the size of the last allocated extent. |
| FCBLBL           | This is the number of user labels allocated for the file. Since each label is a sector long, this is also the number of sectors allocated for user labels.                                                                                                                                       |
| FCBLBLEOF        | This is the end-of-data pointer for the user labels. It is analogous to FCBEOF in that it represents the number of labels written. The initial value is 0.                                                                                                                                       |
| FCBLDEV          | This is the logical device number of the first extent of the file.                                                                                                                                                                                                                               |
| FCBLKST          | This is the previous lock state of the file and is derived from the file label. Legal values are: <ul style="list-style-type: none"> <li>0 - no accessors</li> <li>1 - read</li> <li>2 - write</li> <li>3 - read/write</li> </ul>                                                                |
| FCBNEWFCBV       | This is the vector of the new FCB for the file. It is used in conjunction with FCBACB to move the FCB to a system (shared FCB) control block table when the second accessor is established. If this value is zero then there is no new FCB; if non-zero then a new FCB has been created.         |
| FCBNUMEXTS       | This is the maximum number of extents, less one, allowed for the file. It is not the number of extents presently allocated, which is always determined by counting non-zero entries in the extent map.                                                                                           |
| FCBNUMOPENCLSREC | Number of open and close records in the message file.                                                                                                                                                                                                                                            |
| FCBOCNT          | This is the number of accessors for the file. Alternatively it can be viewed as the number of PACBs created for the file.                                                                                                                                                                        |
| FCBOCNTIN        | This is the number of file accessors having input access.                                                                                                                                                                                                                                        |
| FCBOCNTOUT       | This is the number of file accessors having output access.                                                                                                                                                                                                                                       |

|             |                                                                                                                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCBRIN      | This is the RIN number used to support dynamic locking (i.e. FLOCK and FUNLOCK) for the file. If there is no dynamic locking then this number is zero.                                                 |
| FCBSECTOFF  | This is the sector offset from the file label to the first block of the file. This is not necessarily equal to FCBLBL+1 since an integral number of blocks are allocated for the file and user labels. |
| FCBSECTPBLK | This is the number of sectors in a block for the file.                                                                                                                                                 |
| FCBSIZE     | This is the size, in words, of the complete FCB. It includes the extent map.                                                                                                                           |
| FCBSTART    | Block number of the file's start, excluding the file label block.                                                                                                                                      |
| FCBSUBTYPE  | This is the device sub-type number of the first extent.                                                                                                                                                |
| FCBUSERLBL  | This field describes the user labels for the file. It consists of FCBLBL and FCBLBLEOF, described separately.                                                                                          |

### 3.3 File Label (FLAB)

The file label has the following format:

| 0                        | 1 | 2 | 3 | 7                        | 8 | 12 | 13 | 14 | 15         |         |
|--------------------------|---|---|---|--------------------------|---|----|----|----|------------|---------|
| File name - 1st char.    |   |   |   | File name - 2nd char.    |   |    |    | 0  | FLLOCNAME  |         |
| File name - 3rd char.    |   |   |   | File name - 4th char.    |   |    |    | 1  |            |         |
| File name - 5th char.    |   |   |   | File name - 6th char.    |   |    |    | 2  |            |         |
| File name - 7th char.    |   |   |   | File name - 8th char.    |   |    |    | 3  |            |         |
| Group name - 1st char.   |   |   |   | Group name - 2nd char.   |   |    |    | 4  | FLGRPNAME  |         |
| Group name - 3rd char.   |   |   |   | Group anme - 4th char.   |   |    |    | 5  |            |         |
| Group name - 5th char.   |   |   |   | Group name - 6th char.   |   |    |    | 6  |            |         |
| Group name - 7th char.   |   |   |   | Group name - 8th char.   |   |    |    | 7  |            |         |
| Acct name - 1st char.    |   |   |   | Acct name - 2nd char.    |   |    |    | 10 | FLACCTNAME |         |
| Acct name - 3rd char.    |   |   |   | Acct name - 4th char.    |   |    |    | 11 |            |         |
| Acct name - 5th char.    |   |   |   | Acct name - 6th char.    |   |    |    | 12 |            |         |
| Acct name - 7th char.    |   |   |   | Acct name - 8th char.    |   |    |    | 13 |            |         |
| Creator name - 1st char. |   |   |   | Creator name - 2nd char. |   |    |    | 14 | FLUSERID   |         |
| Creator name - 3rd char. |   |   |   | Creator name - 4th char. |   |    |    | 15 |            |         |
| Creator name - 5th char. |   |   |   | Creator name - 6th char. |   |    |    | 16 |            |         |
| Creator name - 7th char. |   |   |   | Creator name - 8th char. |   |    |    | 17 |            |         |
| Lockword - 1st char.     |   |   |   | Lockword - 2nd char.     |   |    |    | 20 | FLLOCKWORD |         |
| Lockword - 3rd char.     |   |   |   | Lockword - 4th char.     |   |    |    | 21 |            |         |
| Lockword - 5th char.     |   |   |   | Lockword - 6th char.     |   |    |    | 22 |            |         |
| Lockword - 7th char.     |   |   |   | Lockword - 8th char.     |   |    |    | 23 |            |         |
|                          |   |   |   |                          |   |    |    |    | 24         | FLSECMX |
| Security matrix          |   |   |   |                          |   |    |    |    |            |         |





|                                                 |                         |     |                 |
|-------------------------------------------------|-------------------------|-----|-----------------|
| Volume table index                              |                         | 54  | FLXMAP          |
| 1st extent sector number                        |                         | 55  |                 |
| .                                               |                         |     |                 |
| .                                               |                         |     |                 |
| .                                               |                         |     |                 |
| Volume table index                              |                         |     |                 |
| Last extent sector number                       |                         |     |                 |
| .                                               |                         |     |                 |
| .                                               |                         |     |                 |
| .                                               |                         |     |                 |
| File allocation time                            |                         | 154 | FLALLOCTIME     |
|                                                 |                         | 155 |                 |
| File allocation date                            |                         | 156 | FLALLOCDATE     |
| .                                               |                         |     |                 |
| Start of file block number                      |                         | 160 | FLSTART         |
|                                                 |                         | 161 |                 |
| Block number of end of file                     |                         | 162 | FLEND           |
|                                                 |                         | 163 |                 |
| Number of open and close records (message file) |                         | 164 | FLNUMOPENCLSREC |
|                                                 |                         | 165 |                 |
| Device name - 1st char.                         | Device name - 2nd char. | 174 | FLDEVNAME       |
| Device name - 3rd char.                         | Device name - 4th char. | 175 |                 |
| Device name - 5th char.                         | Device name - 6th char. | 176 |                 |
| Device name - 7th char.                         | Device name - 8th char. | 177 |                 |

Other identifiers used:

|               |                     |                            |
|---------------|---------------------|----------------------------|
| FLSECURE      | = FLAB(22).(15:1)#, | file secure bit            |
| (FLSRRELEASE) | = FLAB(22).(14:1)#, | STORE/RESTORE released bit |
| (FLSTORE)     | = FLAB(28).(0:1)#,  | file being stored          |
| FLRESTORE     | = FLAB(28).(1:1)#,  | file being restored        |

|            |                     |                       |
|------------|---------------------|-----------------------|
| (FLLOAD)   | = FLAB(28).(2:1)#,  | file loaded           |
| FLEXCL     | = FLAB(28).(3:1)#,  | exclusive access      |
| FLSR       | = FLAB(28).(0:2)#,  | S & R bits            |
| FLSRL      | = FLAB(28).(0:3)#,  | S, R, & L bits        |
| (FLSRLX)   | = FLAB(28).(0:4)#,  | S, R, L, & X bits     |
| FLSUBTYPE  | = FLAB(28).(4:4)#,  | device sub-type       |
| FLDTYPE    | = FLAB(28).(8:6)#,  | device type           |
| FLSTATUS   | = FLAB(28).(14:2)#, | write/read status     |
| (FLLBLEOF) | = FLAB(29).(0:8)#,  | no. labels written    |
| (FLLBL)    | = FLAB(29).(8:8)#,  | no. labels available  |
| FLSECTOFF  | = FLAB(39).(0:8)#,  | sector offset to data |
| FLNUMEXTS  | = FLAB(39).(11:5)#, | no. extents less 1    |
| FLLABEL    | = FLABDBL(22)#,     | label VTAB and sector |
| FLVTAB     | = FLAB(44).(0:8)#,  | label VTAB index      |

#### Discussion:

**FLACCTNAME** This is the account name of the file. It is eight bytes in length with trailing blanks added.

**FLALLOCDATE** Date that the file was allocated on this system.

**FLALLOCTIME** Doubleword containing the time that the file was allocated on this system.

**FLBLKSIZE** This is the block size, in sectors, of the file.

**FLCHECKSUM** This is the exclusive-OR checksum of the file label (excluding words 34, 42, and 43 octal) and is used for error detection. Each time the file label is read from disc the check sum is calculated and compared against the value recorded in the file label. Similarly, each time the file label is written to the disc the check sum is calculated and inserted into the file label.

**FLCLID** This is the cold load number in effect the last time that the file was accessed. This should always be the current cold load number. If it is not it means that the system crashed while the file was open and that the data in the file label should be "reset" (principally the FCB vector FLFCBVECT).

**FLCREATE** This is the creation date of the file. It is in the format defined by the intrinsic CALENDAR.

**FLDEVNAME** This is the FOPEN device specification that was used when the file was created. This information is needed when new extents are allocated.

**FLDTYPE** This is the device type number of the first extent of the file; see ACBDTYPE for a list of legal values. This value is determined by configuration.

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------|------|-----------------|------|----------|------|-----------------|------|--------------------|------|-------------------------|------|---------|------|--------------|------|-----------|------|---------|------|--------------------------------|------|--------------------------------------|------|-----------------------------------|------|-------------------------------|------|---------------------------|------|----------------|------|-------------------------------|------|----------------------|------|-----------------|------|-----------------|------|---------------|
| <b>FLEND</b>      | Number of current data blocks (that is, the end of file block number relative to the start of file).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| <b>FLEOF</b>      | This is the end-of-file pointer for the file. It is a double word integer representing the number of records in the file. It can also be viewed as the record number of the next record past EOF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| <b>FLEXCL</b>     | This is the exclusive access flag for the file. If set it means that the file has been opened exclusively by a single accessor. If not set then the file is potentially accessible by others.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| <b>FLEXTMAP</b>   | This is the extent map of the file. The number of extents is specified by FLNUMEXTS; a 0D extent descriptor indicates that the extent has not been allocated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| <b>FLEXTSIZE</b>  | This is the extent size, in sectors, of the file. All extents in the file, except the last, have this extent size. This is a logical value, and legal values range from 1 to 65535 sectors. This limits the maximum file size to 2097120 sectors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| <b>FLFCBVECT</b>  | If non-zero, this is the vector of the FCB for the file. If zero, the file is not being accessed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| <b>FLFILECODE</b> | This is the file code of the file. Known values are:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
|                   | <table border="0" style="margin-left: 40px;"> <tr><td>-401</td><td>IMAGE data set</td></tr> <tr><td>-400</td><td>IMAGE root file</td></tr> <tr><td>1024</td><td>USL file</td></tr> <tr><td>1025</td><td>BASIC data file</td></tr> <tr><td>1026</td><td>BASIC program file</td></tr> <tr><td>1027</td><td>BASIC fast program file</td></tr> <tr><td>1028</td><td>RL file</td></tr> <tr><td>1029</td><td>Program file</td></tr> <tr><td>1030</td><td>STAR file</td></tr> <tr><td>1031</td><td>SL file</td></tr> <tr><td>1040</td><td>Cross Loader ASCII file (SAVE)</td></tr> <tr><td>1041</td><td>Cross Loader relocatable binary file</td></tr> <tr><td>1042</td><td>Cross Loader ASCII file (DISPLAY)</td></tr> <tr><td>1050</td><td>EDITOR KEEPQ file (non-COBOL)</td></tr> <tr><td>1051</td><td>EDITOR KEEPQ file (COBOL)</td></tr> <tr><td>1060</td><td>RJE punch file</td></tr> <tr><td>1069</td><td>RSAM (Bob Strand's ISAM) file</td></tr> <tr><td>1070</td><td>QUERY procedure file</td></tr> <tr><td>1071</td><td>QUERY work file</td></tr> <tr><td>1072</td><td>QUERY work file</td></tr> <tr><td>1080</td><td>KSAM key file</td></tr> </table> | -401 | IMAGE data set | -400 | IMAGE root file | 1024 | USL file | 1025 | BASIC data file | 1026 | BASIC program file | 1027 | BASIC fast program file | 1028 | RL file | 1029 | Program file | 1030 | STAR file | 1031 | SL file | 1040 | Cross Loader ASCII file (SAVE) | 1041 | Cross Loader relocatable binary file | 1042 | Cross Loader ASCII file (DISPLAY) | 1050 | EDITOR KEEPQ file (non-COBOL) | 1051 | EDITOR KEEPQ file (COBOL) | 1060 | RJE punch file | 1069 | RSAM (Bob Strand's ISAM) file | 1070 | QUERY procedure file | 1071 | QUERY work file | 1072 | QUERY work file | 1080 | KSAM key file |
| -401              | IMAGE data set                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| -400              | IMAGE root file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1024              | USL file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1025              | BASIC data file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1026              | BASIC program file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1027              | BASIC fast program file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1028              | RL file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1029              | Program file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1030              | STAR file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1031              | SL file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1040              | Cross Loader ASCII file (SAVE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1041              | Cross Loader relocatable binary file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1042              | Cross Loader ASCII file (DISPLAY)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1050              | EDITOR KEEPQ file (non-COBOL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1051              | EDITOR KEEPQ file (COBOL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1060              | RJE punch file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1069              | RSAM (Bob Strand's ISAM) file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1070              | QUERY procedure file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1071              | QUERY work file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1072              | QUERY work file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |
| 1080              | KSAM key file                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                |      |                 |      |          |      |                 |      |                    |      |                         |      |         |      |              |      |           |      |         |      |                                |      |                                      |      |                                   |      |                               |      |                           |      |                |      |                               |      |                      |      |                 |      |                 |      |               |

1081  
to Reserved for KSAM  
1089  
8000  
to Reserved for APL  
8099

**FLFLIM** This is the end-of-space pointer for the file. It is a double integer representing the maximum number of records (fixed length record format) or blocks (undefined or variable length record format) in the file.

**FLFOPTIONS** This is the FOPTIONS of the file.

**FLGRPNAME** This is the group name of the file. It is eight bytes long with trailing blanks added.

**FLLABEL** This is the volume table index and sector number of the file label, which is the same as the first extent descriptor.

**FLLASTACC** This is the last access date of the file. It is in the format defined by the intrinsic CALENDAR.

**FLLASTMOD** This is the last modification date of the file. It is in the format defined by the intrinsic CALENDAR.

**FLLASTTEXTSIZE** This is the size, in sectors, of the last extent in the file. If the file has one extent then this is the same as FLEXTSIZE; if the file has more than one extent then this value may be different from FLEXTSIZE. This is the size of the last physical extent for the file; it is not the size of the last allocated extent.

**FLLBL** This is the number of user labels allocated for the file. Since each label is a sector long, this is also the number of sectors allocated for user labels.

**FLBLEOF** This is the end-of-data pointer for the user labels. It is analogous to FLEOF in that it represents the number of labels written.

**FLLOAD** This is the LOADED flag for the file. If set it means that the file is a loaded program or SL file and cannot be modified except by a privileged accessor. This flag is set and cleared by the loader, not the file system.

**FLLOCK** This identifies the word containing the lock bits, which are described separately.

**FLLOCKWORD** This is the lock word of the file. It is eight bytes long with trailing blanks added. If it is all blanks then the file does not have a lockword.

**FLLOCNAME** This is the local name of the file. It is eight bytes long with trailing blanks added.

**FLNUMEXTS** This is the number of extents, less one, allowed for the file. It is not the number of extents allocated. Legal values range from 0 to 31, i. e., 1 to 32 extents.

**FLNUMOPENCLSREC** Number of open and close records in the message file.

**FLRECSIZE** This is the record size of the file in negative bytes.

**FLRESTORE** This is the RESTORE flag for the file. If set it means that the file is being RESTOREd and cannot be accessed. RESTORE also sets the STORE bit for the file (FLSTORE); see FLRSR for a full description of the use of these bits. This flag is set and cleared by STORE/RESTORE, not the file system.

**FLSECMX** This is the security matrix of the file. The bits are organized into five groups of six bits each. (Bits 0:2 are not used.) The groups correspond to the access types: READ, APPEND, WRITE, LOCK, and EXECUTE. Within each group, each bit specifies who may have the access: ANY, ACCOUNT MGR, ACCOUNT LIBRARIAN, GROUP, GROUP LIBRARIAN, CREATOR.

**FLSECTOFF** This is the sector offset from the file label to the first block of the file. This is not necessarily equal to FLLBL+1 since an integral number of blocks are allocated for the file and user labels.

**FLSECURE** This is the file security enforcement flag for the file. If not set then the file has been RELEASEd and the security matrix FLSECMX should be ignored. If set then secured as specified by the security matrix.

**FLSR** This is the STORE and RESTORE flags for the file, which are described separately. STORE and RESTORE decode the two-bit field to indicate their operation. Legal values are:

- 0 - file not in use by either STORE or RESTORE
- 1 - illegal value
- 2 - file being STOREd
- 3 - file being RESTOREd

The file system interprets the leftmost bit as indicating that the file is being accessed by either STORE or RESTORE. The rightmost bit is interpreted as indicating what access should be permitted: 0 (file being STOREd) allows read access; 1 (file being RESTOREd) allows no access. This field is set and reset by STORE/RESTORE, not the file system.

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FLSRL</b>       | This is the STORE, RESTORE and LOADED flags for the file, which are described separately.                                                                                                                                                                                                                                                                                                                                                |
| <b>FLSRLX</b>      | This is the STORE, RESTORE, LOADED and exclusive flags for the file, which are described separately.                                                                                                                                                                                                                                                                                                                                     |
| <b>FLSRRELEASE</b> | This flag is used by STORE/RESTORE. If a file is STORED with the ";RELEASE" keyword, STORE will set this flag in the tape copy of the file label. RESTORE will allow any user to access such files, regardless of the file's normal security. If this bit is off in the tape copy of the file label, RESTORE applies normal security checks (as defined by the information in FLSECMX and FLSECURE). This bit is zero for files on disc. |
| <b>FLSTART</b>     | Block number of the file's start, excluding the file label block.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>FLSTATUS</b>    | <p>This is the read/write status of the file. Legal values are:</p> <ul style="list-style-type: none"> <li>0 - no accessors</li> <li>1 - read</li> <li>2 - write</li> <li>3 - read/write</li> </ul>                                                                                                                                                                                                                                      |
| <b>FLSTORE</b>     | This is the STORE/RESTORE flag for the file. If set it means that the file is being either STORED or RESTORED. The RESTORE bit (FLRESTORE) must be interrogated to determine which operation is taking place; see FLSR for a full description of the use of these bits. This flag is set and cleared by STORE/RESTORE, not the file system.                                                                                              |
| <b>FLSUBTYPE</b>   | This is the device sub-type number of the first extent of the file. This value is determined by configuration.                                                                                                                                                                                                                                                                                                                           |
| <b>FLUSERID</b>    | This is the creating user name of the file. It is eight bytes long with trailing blanks added.                                                                                                                                                                                                                                                                                                                                           |
| <b>FLUSERLBL</b>   | This field describes the user labels of the file. It consists of FLLBL and FLLBLEOF, which are described separately.                                                                                                                                                                                                                                                                                                                     |
| <b>FLVTAB</b>      | This is the volume table index of the first extent of the file.                                                                                                                                                                                                                                                                                                                                                                          |

### 3.4 File Multi-Access Vector Table (FMAVT)

(SIR %20)

The FMAVT points to the shared PACB for files opened multi-access. It occupies its own data segment (DST 54 octal). Its entry format is:

|                |   |   |   |   |   |              |         |    |    |    |   |
|----------------|---|---|---|---|---|--------------|---------|----|----|----|---|
| 0              | 1 | 2 | 3 | 6 | 7 | 8            | 12      | 13 | 14 | 15 |   |
| -----          |   |   |   |   |   |              |         |    |    |    |   |
| 1              | G | D |   |   |   |              | JIT DST |    |    |    | 0 |
| -----          |   |   |   |   |   |              |         |    |    |    |   |
| Logical Device |   |   |   |   |   |              |         |    |    |    | 1 |
| -----          |   |   |   |   |   |              |         |    |    |    |   |
|                |   |   |   |   |   | Disk Address |         |    |    |    | 2 |
| -----          |   |   |   |   |   |              |         |    |    |    |   |
|                |   |   |   |   |   | PACB Vector  |         |    |    |    | 3 |
| -----          |   |   |   |   |   |              |         |    |    |    |   |

Since spoolfiles are multi-access, they will have entries in the FMAVT. Disk files and spool files have the disk address in words 1 and 2, and bit D is 0. For device files, the disk address is zero and bit D is 1. Unused entries have word 0 all zeroes. Bit G is set on for global multi-access. This allows multi-access between jobs.

### 3.5 System Global Area (SYSGLOB)

The file system uses several words in the system global area for its own use.

|              |               |                              |
|--------------|---------------|------------------------------|
| SHFCBDST     | = SYSDB+%76,  | shared FCB DST no.           |
| MONITOR      | = SYSDB+%77,  | monitoring flag word         |
| MAXSSECT     | = SYSDB+%100, | max # spoolfile sectors      |
| NUMSSECT     | = SYSDB+%102, | current # spoolfile sectors  |
| EXTSSECT     | = SYSDB+%104, | # sectors/spoolfile extent   |
| SPOOLINDEX   | = SYSDB+%132, | class spool index            |
| CSIOWAIT     | = SYSDB+%135, | CSIOWAIT PLABEL              |
| CCLOSEPLABL  | = SYSDB+%140, | CS CCLOSE PLABEL - FPROCTERM |
| DSCHKPLABL   | = SYSDB+%335, | DSCHECK PLABEL               |
| DSOPENPLABL  | = SYSDB+%336, | DSOPEN PLABEL                |
| DSCLOSEPLABL | = SYSDB+%337, | DSCLOSE PLABEL               |
| SDSLDEVLABEL | = SYSDB+%323, | PLABEL for SDSLDEV           |
| MANWCPLABL   | = SYSDB+%340; | MANAGEWRITECONV PLABEL       |

### 3.6 SIRs, Locks, and Deadlocks

-----

The file system uses two SIRs: the File SIR, which is intended to protect file label integrity, and the FMAVT SIR, which is to guarantee the integrity of the FMAVT. Since the file system locks these resources, and also locks control blocks, deadlocks can occur if locking is done in the wrong order. Not only must the file system handle locking correctly, but the entire ensemble of the file system, its callers, and its callees must do so also. These include KSAM, which has a SIR of its own, and SYSDUMP and STORE, which lock the File SIR because they tweak bits in file labels. The presently accepted order is:

Get FMAVT SIR  
Lock ACB  
Get File SIR  
Lock FCB

It may not be necessary to do all of these things in any particular procedure. In modifying a procedure, you should be sure that any of these locks which you change are consistent not only within your own code, but also with its callers and callees.



## 7.1 Introduction

The operating system maintains state, control, and accounting information on each process. The data structures for this purpose are the process control block table (PCB; core resident, 1 entry per process) and the process control block extension (PCBX; contained in the process' stack below DL). Process related information which must be accessible even when the process' stack is not present in main memory is maintained in the process' PCB entry. All other process related information is maintained in the process' PCBX.

A process is identified in the system by its PCB entry number, referred to as its PIN (process identification number), or by its PCBPT=(PIN)\*(PCB entry size).

The structure of the PCB table, PCB entry format, PCBX structure, and PCBX format are specified in this chapter.

## 7.2 Process Control Block Table Structure and Format

### 7.2.1 Fixed Cells Related to PCB

- 3 Absolute address of base of PCB table
- 4 Absolute address of current process' PCB entry
- %1003 Sysbase relative address of PCB table base
- %1271 Sysbase relative address of head of dispatching queue's PCB entry
- %1272 Sysbase relative address of tail of dispatching queue's PCB entry

### 7.2.2 PCB Entry 0 Format

|    |                                                |
|----|------------------------------------------------|
| 0  | # OF CONFIGURED ENTRIES                        |
| 1  | ENTRY LENGTH (%20)                             |
| 2  | # OF UNASSIGNED ENTRIES                        |
| 3  | TABLE RELATIVE INDEX TO FIRST UNASSIGNED ENTRY |
| 4  | 0                                              |
| 5  | 0                                              |
| 6  | 0                                              |
| 7  | 0                                              |
| 8  | 0                                              |
| 9  | 0                                              |
| 10 | 0                                              |
| 11 | 0                                              |
| 12 | 0                                              |
| 13 | 0                                              |
| 14 | 0                                              |
| 15 | 0                                              |

### 7.2.3 Unassigned PCB Entry Format

|    |                                               |
|----|-----------------------------------------------|
| 0  | %100000                                       |
| 1  | TABLE RELATIVE INDEX TO NEXT UNASSIGNED ENTRY |
| 2  | 0                                             |
| 3  | 0                                             |
| 4  | 0                                             |
| 5  | 0                                             |
| 6  | 0                                             |
| 7  | 0                                             |
| 8  | 0                                             |
| 9  | 0                                             |
| 10 | 0                                             |
| 11 | 0                                             |
| 12 | 0                                             |
| 13 | 0                                             |
| 14 | 0                                             |
| 15 | 0                                             |

### 7.2.3 Assigned PCB Entry Format

|       | 0                                                          | 1    | 2 | 3   | 4  | 5 | 6     | 7         | 8 | 9  | 10 | 11 | 12 | 13       | 14              | 15       |                |
|-------|------------------------------------------------------------|------|---|-----|----|---|-------|-----------|---|----|----|----|----|----------|-----------------|----------|----------------|
| PCB00 | S                                                          | B    | C | H   | P  | H | I     | P         | M | L  | S  | T  | U  | H        |                 | R        | RESABORTINFO   |
|       | A                                                          | F    | R | S   | I  | S | P     | C         | P | W  | W  | R  | S  | I        |                 | I        |                |
|       | R                                                          |      | I | I   | O  | P | E     |           |   |    |    | W  | E  | P        |                 | T        |                |
|       |                                                            |      | T | R   | V  | R | X     |           |   |    |    |    | D  | R        |                 | B        |                |
|       |                                                            |      |   | R   | I  | P |       |           |   |    |    |    | Q  | I        |                 | K        |                |
| PCB01 | SYSBASE RELATIVE ADDRESS OF PROCESS' SEGMENT LOCALITY LIST |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          | SLLPTR         |
|       | A                                                          |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          |                |
|       | D                                                          |      |   | XDS |    |   | DST#  |           |   |    |    |    |    |          |                 | RESERVED |                |
| PCB02 | B                                                          |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          | DBXDSINFO      |
|       | A                                                          |      |   |     |    |   |       |           |   |    |    |    | S  |          |                 |          |                |
| PCB03 | O                                                          |      |   | STK |    |   | DST#  |           |   |    |    |    | C  | RESERVED |                 |          | STKINFO        |
|       |                                                            |      |   |     | B  |   | U     | J         | T | M  | S  |    | I  | S        | T               | M        |                |
| PCB04 | M                                                          | R    | R | M   | I  | I | C     | N         | I | S  | O  | FA | M  | I        | I               | E        | WAKEMASK       |
|       |                                                            | G    | L | A   | O  | O | P     | K         | M | G  | N  |    | P  | R        | M               | M        |                |
| PCB05 | FATHER'S PIN                                               |      |   |     |    |   |       | SON'S PIN |   |    |    |    |    |          | FATHERSONINFO   |          |                |
| PCB06 | NEXT BROTHER'S PIN                                         |      |   |     |    |   |       | BLKIDX    |   |    |    |    |    |          | BROTHERINFO     |          |                |
| PCB07 | PIMP PIN                                                   |      |   |     |    |   |       | BPTLINK   |   |    |    |    |    |          | PIMPINBREAKLINK |          |                |
|       |                                                            |      |   |     |    |   | D     |           |   |    |    |    |    |          |                 |          |                |
|       |                                                            |      |   |     |    |   | E     | F         |   |    |    |    |    |          |                 |          |                |
| PCB08 |                                                            | PSIM |   |     | OA |   | A     | A         |   |    |    |    |    |          |                 |          | PIINFONIMPPIN  |
|       |                                                            |      |   |     |    |   | D     | C         |   |    |    |    |    |          |                 |          |                |
|       |                                                            |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          |                |
| PCB09 | L                                                          | BMS  |   | PPC | S  |   | PTYPE |           |   | HK | SK | ST | HB | CY       | BK              |          | PROCSTATE      |
|       | I                                                          |      |   |     | O  |   |       |           |   |    |    |    |    |          |                 |          |                |
|       | V                                                          |      |   |     | V  |   |       |           |   |    |    |    |    |          |                 |          |                |
| PCB10 | EVENT FLAGS                                                |      |   |     |    |   |       |           |   |    |    |    |    |          | WS              |          | EVENTFLAGS     |
| PCB11 | SEGIDENTIFIER OF LAST REF. SWAPPABLE SEGMENT               |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          | LASTREFSWAPSEG |
| PCB12 | CSTX BLOCK MAP INDEX                                       |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          | PBX            |
|       |                                                            |      |   |     |    |   |       |           |   |    |    |    |    |          |                 |          |                |
| PCB13 | D                                                          | L    | C | D   | E  | I | C     |           |   |    |    |    |    |          |                 |          | QUEUEINGINFO   |
|       | I                                                          | Q    |   |     |    | N | O     |           |   |    |    |    |    |          |                 |          |                |
|       | S                                                          |      |   |     |    | T | R     |           |   |    |    |    |    |          |                 |          |                |
|       | P                                                          |      |   |     |    | E | E     |           |   |    |    |    |    |          |                 |          | PRIORITY       |
|       | Q                                                          |      |   |     |    | R | R     |           |   |    |    |    |    |          |                 |          |                |

|       |                                              |       |
|-------|----------------------------------------------|-------|
| PCB14 | SYSBASE INDEX OF NEXT PCB ENTRY IN QUEUE     | NQPTR |
| PCB15 | SYSBASE INDEX OF PREVIOUS PCB ENTRY IN QUEUE | PQPTR |

#### 7.2.4 PCB Assigned Entry Field Descriptions

|       |         |                                                                            |
|-------|---------|----------------------------------------------------------------------------|
| PCB00 | .(0:1)  | SAR ==> scheduling attention required                                      |
|       | .(1:1)  | Bounds Flag -- Priv mode bounds check                                      |
|       | .(2:1)  | CRIT ==> process is critical                                               |
|       | .(3:1)  | HSIR ==> process has a sir                                                 |
|       | .(4:1)  | PIOVR ==> pending PI, process critical                                     |
|       | .(5:1)  | HSPRI ==> hold sir priority                                                |
|       | .(6:1)  | IPEXP ==> incore protect expired                                           |
|       | .(7:1)  | PC ==> preempt capability                                                  |
|       | .(8:1)  | MP ==> must preempt                                                        |
|       | .(9:1)  | LW ==> long wait                                                           |
|       | .(10:1) | SW ==> short wait                                                          |
|       | .(11:1) | TRW ==> terminal read wait                                                 |
|       | .(12:1) | USEDQ ==> used a quantum since transaction began                           |
|       | .(13:1) | HIPRI ==> hold impeded priority                                            |
|       | .(14:1) | Reserved.                                                                  |
|       | .(15:1) | RITBK                                                                      |
| PCB01 | .(0:16) | SLLPTR, SYSBASE relative index to process' segment locality list           |
| PCB02 | .(0:1)  | ADB, set if db pointing to an absolute address                             |
|       | .(1:10) | XDS, DST entry number of extra data seg. to which DB is set; zero if none. |
|       | .(11:4) | Reserved for expansion of DST entry number field                           |
| PCB03 | .(0:1)  | STOVRALL FLAG ==> stack overflow is already allocated                      |
|       | .(1:10) | DST entry number of process' stack                                         |
|       | .(11:1) | SC, set if executing system code                                           |
|       | .(12:3) | Reserved                                                                   |

# PCB (CONT.)

---

```

PCB04 .(0:1) M, mourning wait.
 .(1:1) RG, global RIN wait.
 .(2:1) RL, local RIN wait.
 .(3:1) MA, mail wait.
 .(4:1) BIO, blocked I/O wait.
 .(5:1) IO, I/O wait.
 .(6:1) UCP, UCOP wait and RIT wait.
 .(7:1) JNK, junk wait.
 .(8:1) TIM, timer wait.
 .(9:1) MSG, file system basic ipc message wait.
 .(10:1) SON, son wait.
 .(11:1) FA, father wait.
 .(12:1) IMP, process waiting to be unimpeded.
 .(13:1) SIR, process waiting for a sir.
 .(14:1) TIM, process waiting for a time out.
 .(15:1) MEM, process waiting for memory.

PCB05 .(0:8) FPIN, father's PCB entry number
 .(8:8) SPIN, son's PCB entry number

PCB06 .(0:8) BPIN, brother's PCB entry number
 .(8:8) BLKIDX (reserved)

PCB07 .(0:8) PIMPPIN, previous impeded pin.
 .(8:8) BPTLINK, breakpoint link for process.

PCB08 .(0:3) PSIM, pseudo - interrupt mode
 1: hard kill
 2: soft kill
 3: stop
 4: hibernate
 5: escape
 6: break
 7: normal
 .(3:1) Reserved for future use.
 .(4:2) OA
 0: other source
 1: father
 2: son
 3: reply done on RIT wait
 .(6:1) DEAD, set during expiration.
 .(7:1) FAC, if set, the father is to be activated on process
 termination.
 .(8:8) NIMPPIN, next impeded process' pin

```

# PCB (CONT.)

---

```

PCB09 .(0:1) LIVE, set if process is alive.
 .(1:2) BMS, block mail, valid if MA set
 0: sent to father
 1: rec from father
 2: send to son
 3: rec from son
 .(3:2) PPC, process to process communication, set with
 respect to son.
 0: null
 1: son to father
 2: father to son
 3: blocked
 .(5:1) STOV, stack overflow bit
 .(6:3) PTYPE, process type
 0: user
 1: user, son of main
 2: user, main
 3: user, main, task
 4: system
 5:
 6: system, UCOP
 7:
 .(9:1) Reserved.
 .(10:1) HK, hard kill pseudo interrupt
 .(11:1) SK, soft kill pseudo interrupt
 .(12:1) ST, stop pseudo interrupt
 .(13:1) HB, hibernate pseudo interrupt
 .(14:1) CY, control-y pseudo interrupt
 .(15:1) BK, break pseudo interrupt

PCB10 .(0:15) EVENTFLAGS, one for each wait class in PCB04
 .(15:1) WS, wake up waiting switch set if an awake is
 missing.

PCB11 .(0:16) LASTREFSWAPSEG, segment identifier of last
 referenced swappable code segment.

PCB12 .(0:16) PBX, CSTX block map index of process' program.

PCB13 (QUEUEING INFO)
 .(0:1) DISPQ ==> on dispatching queue
 .(1:1) L scheduling class
 .(2:1) C scheduling class
 .(3:1) D scheduling class
 .(4:1) E scheduling class
 .(5:1) INTER ==> process is interactive
 .(6:1) CORER ==> process is core resident
 .(7:1) Reserved.
 .(8:8) Process' scheduling priority

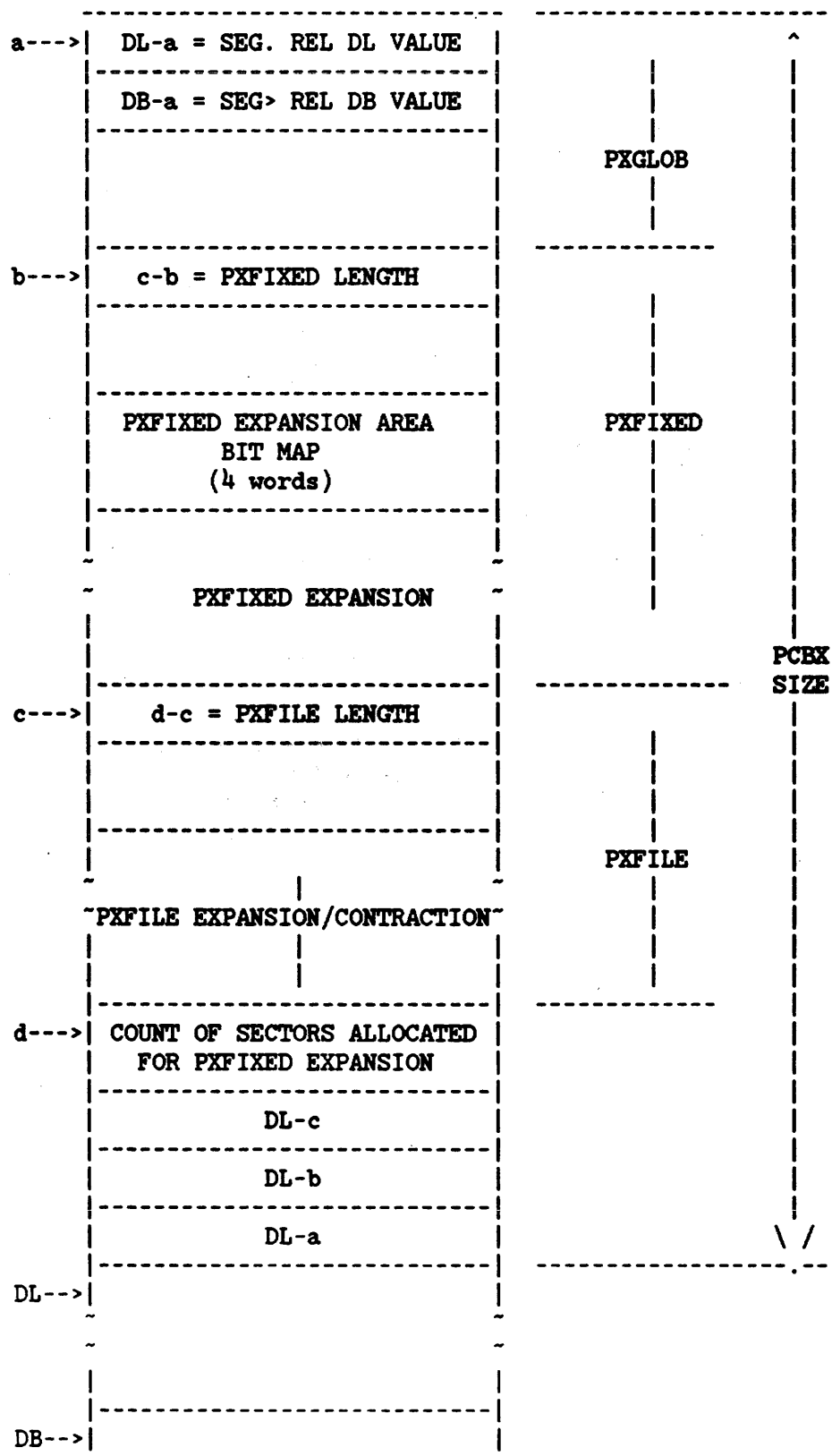
```

|       |         |                                                                          |
|-------|---------|--------------------------------------------------------------------------|
| PCB14 | .(0:16) | NQPTR, sysbase index of PCB entry of next process in scheduling queue    |
| PCB15 | .(0:16) | PQPTR, sysbase index of PCB entry of previos process in scheduling queue |



## 7.3 PCBX Structure and Format

### 7.3.1 PCBX General Structure



### 7.3.2 PXGLOB FORMAT

The PXGLOB portion of the pcbx is for job information, and contains the same job related information for all processes belonging to the same job.

| 0                                                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8                       | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-------------------------------------------------------------|---|---|---|---|---|---|---|-------------------------|---|----|----|----|----|----|----|
| --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| DL-a=SEG. REL DL VALUE                                      |   |   |   |   |   |   |   |                         |   |    |    |    |    |    | 0  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| DB-a=SEG. REL DB VALUE                                      |   |   |   |   |   |   |   |                         |   |    |    |    |    |    | 1  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| USER ATTRIBUTES                                             |   |   |   |   |   |   |   |                         |   |    |    |    |    |    | 2  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| JMAT INDEX                                                  |   |   |   |   |   |   |   | ACTUAL JOB INPUT LDN    |   |    |    |    |    |    | 3  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| JPCNTINDEX(RelByteAddr)                                     |   |   |   |   |   |   |   | ACTUAL JOB OUTPUT LDN   |   |    |    |    |    |    | 4  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| STACK DUMP FLAGS                                            |   |   |   |   |   |   |   | JDT DST INDEX           |   |    |    |    |    |    | 5  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| R   TY   D   I                                              |   |   |   |   |   |   |   | JIT DST INDEX           |   |    |    |    |    |    | 6  |
| -----                                                       |   |   |   |   |   |   |   |                         |   |    |    |    |    |    |    |
| JCUT INDEX                                                  |   |   |   |   |   |   |   | ** /// ***** ////////// |   |    |    |    |    |    |    |

R = restart bit  
 I = job in/list interactive  
 D = job in/list duplicative  
 TY = job type  
 0 = undefined  
 1 = session  
 2 = job  
 3 = task  
 \* = reserved:

Stack Dump Flags  
 Bit 0 = Armed  
 Bit 1 = Suppress ASCII  
 Bit 2 = Suppress traceback  
 Bit 3 = Q-63 to S  
 Bit 4 = QINIT to S  
 Bit 5 = DL to QINIT

### 7.3.3 PXFIXED ASSIGNMENTS

The PXFIXED portion of the pcbx contains specific information and control information.

|    |                                                 |    |                                                                  |
|----|-------------------------------------------------|----|------------------------------------------------------------------|
| 0  | c-b PXFIXED SIZE                                | 0  |                                                                  |
| 1  | RELATIVE S(S-DB)                                | 1  |                                                                  |
| 2  | RELATIVE Z(Z-DB)                                | 2  |                                                                  |
| 3  | INITIAL Q(Q-DB)                                 | 3  |                                                                  |
| 4  | INITIAL RELATIVE DL (DB-DL)                     | 4  |                                                                  |
| 5  | GENERAL RESOURCE CAPABILITY(FROM PROG-FILE)     | 5  | Trap Modes<br>.MAT(12:1)-Arith.                                  |
| 6  | RESERVED   MAT   MLT   MST   MCY                | 6  | .MLT(13:1)-Library<br>.MST(14:1)-System<br>.MCY(15:1)-Ctl-Y      |
| 7  | LINK TO XDS ENTRIES IN EXPANSION AREA   XDS CNT | 7  | (XDS CNT- 12:4)                                                  |
| 10 | P   S   EXTRA DATA SEGMENT DST INDEX            | 8  |                                                                  |
| 11 | P   S   EXTRA DATA SEGMENT DST INDEX            | 9  |                                                                  |
| 12 | P   S   EXTRA DATA SEGMENT DST INDEX            | 10 | / 0:1 RESERVED FOR<br>CST EXPANSION                              |
| 13 | P   S   EXTRA DATA SEGMENT DST INDEX            | 11 | 1:1 = 1 IF ABORT<br>IN PROGRESS                                  |
| 14 | X   A   ABORT Y   RW   INITIAL CST INDEX        | 12 | < 7:1 = 0 IF HAVE R/W<br>ACCESS TO<br>PROG FILE<br>= 1 OTHERWISE |
| 15 | MAXIMUM STACK SIZE(MAXDATA LIMIT)               | 13 |                                                                  |
| 16 | ARITHMETIC TRAP MASK                            | 14 | 8:8 = CST # OF SEG<br>INITIALLYEXECUTED                          |
| 17 | ARITHMETIC TRAP PLABEL                          | 15 | \ AT PROC CREATION                                               |
| 20 | LIBRARY TRAP PLABEL                             | 16 |                                                                  |
| 21 | SYSTEM TRAP PLABEL                              | 17 |                                                                  |
| 22 | CONTROL Y PLABEL                                | 18 |                                                                  |
| 23 | JOB   TYPE   JOB#                               | 19 | JOB TYPE:<br>1=SESSION<br>2=JOB                                  |
| 24 | ACTUAL SIZE OF VIRTUAL SPACE ALLOCATED TO STACK | 20 |                                                                  |
| 25 | USER ABORT PLABEL                               | 21 |                                                                  |
| 26 | U   L   C   A   LOAD PROCEDURE I.D.             | 22 | U user udcx exist<br>L logging<br>A acct udcx exist              |
| 27 | CUR.MAX STACK SIZE(largest value ever for Z-DL) | 23 | C process shares clock<br>1 => clock shared                      |

(reserved)

PKFIXED (CONT.)

|    |                                            |    |
|----|--------------------------------------------|----|
| 30 | PROCESS CPU TIME                           | 24 |
| 31 | (MSEC)                                     | 25 |
| 32 | MAXIMUM DATA SEG SIZE USED(IN SECTORS)     | 26 |
| 33 | TOTAL VIRTUAL STORAGE USED(IN SECTORS)     | 27 |
| 34 | CURRENT EXTRA DATA SEGMENT SPACE           | 28 |
| 35 | MAXIMUM EXTRA DATA SEGMENT SPACE           | 29 |
| 36 | ///////////////// STOV COUNT               | 30 |
| 37 | PROCESS EXECUTION TIME REMAINDER (IN MSEC) | 31 |
| 40 | SET TO-1 WHEN IN BREAK MODE*               | 32 |
| 41 | CONTINUE FLAG (:CONTINUE COMMAND)**        | 33 |
| 42 | IMAGE PLABL                                | 34 |
| 43 | ERROR LEVEL                                | 35 |
| 44 | INTRINSIC ERRORS                           | 36 |
| 45 | INTRINSIC ERRORS                           | 37 |
| 46 | INTRINSIC ERRORS                           | 38 |
| 47 | INTRINSIC ERRORS                           | 39 |
| 50 | INTRINSIC ERRORS                           | 40 |
| 51 | INTRINSIC ERRORS                           | 41 |
| 52 | TSLR, virtual time since last rescheduled  | 42 |
| 53 | TSTB, virtual time since transaction began | 43 |
| 54 | TSSWAPIN, virtual time since swapin        | 44 |
| 55 | TSLA, virtual time since last absence      | 45 |
| 56 | TSLD, virtual time since last deallocation | 46 |
| 57 | QCNT, quanta used since transaction began  | 47 |
| 60 | RESERVED                                   | 48 |

|     |                                      |    |
|-----|--------------------------------------|----|
| 61  | RESERVED                             | 49 |
| 62  | # LAUNCHES                           | 50 |
| 63  | # SL FAULTS                          | 51 |
| 64  | # PCB FAULTS                         | 52 |
| 65  | # DATA SEG FAULTS                    | 53 |
| 66  | # BLOCKED DISC I/O's ISSUED          | 54 |
| 67  | # UNBLOCKED DISC I/O's REQUESTED     | 55 |
| 70  | # UNBLOCKED DISC I/O's WAITED ON     | 56 |
| 71  | # IMPEDES (SUBSYSTEM)                | 57 |
| 72  | # IMPEDES (SYSTEM)                   | 58 |
| 73  | # SIR BLOCKS                         | 58 |
| 74  | //////////////////////////////////// | 60 |
| 75  | //////////////////////////////////// | 61 |
| 76  | RESERVED                             | 62 |
| 77  | RESERVED                             | 63 |
| 100 | PCLASSMASK                           | 64 |
| 101 | PROCQUESTOPWORD                      | 65 |
| 102 | PROCSTOPTIME                         | 66 |
| 103 |                                      | 67 |

NOTES: P = 0 if opened by priv user  
S = 1 if data seg is sharable

PCLASSMASK = BIT MASK OF CLASSES THIS PROCESS HAS ENABLED

PROCQUESTOPWORD.(0:4) = PROCESS PRIORITY: 7 => L QUEUE

6 => C QUEUE

2 => D QUEUE

1 => E QUEUE

.(4:12)= REASON STOPPED: 1 => STOP SEG FAULT

2 => STOP DISC WAIT

3 => BLOCKED I/O, NON TERMINAL

4 => TERMINAL READ

5 => STOP IMPEDE

6 => STOP ACTIVE

PROCSTOPTIME = DBL WORD TIMESTAMP OF WHEN PROCESS STOPPED FOR  
REASON GIVEN IN PROCQUESTOPWORD

\* SET TO COMMAND RECORD LENGTH WHEN COMMAND PENDING  
(I.E. COMMAND ENTERED DURING BREAK OR ENCOUNTERED  
DURING FLUSHING).

\*\* CONTINUE FLAG VALUES

0 = NO CONTINUE IN EFFECT

1 = CONTINUE JUST ENCOUNTERED

2 = CONTINUE IN EFFECT FOR THIS COMMAND

#### 7.3.4 PXFIXED EXPANSION BITMAP

The PXFIXED bitmap and expansion area is for use in accounting of extra data segments acquired by the process.

##### File System Section of PCBX (PXFILE)

The PXFILE area is a sub-section of the PCBX. It is a contiguous, expandable and contractable block of storage that is managed by the file system primarily for its own use. Other sybsystems, namely CS and DS, also make use of the PXFILE section. In doing so they must conform to the conventions of the file system.

The overall structure of the PXFILE area is:

|                         |            |
|-------------------------|------------|
| OVERHEAD                | (fixed)    |
| CONTROL BLOCK<br>TABLE  | (variable) |
| AVAILABLE               | (variable) |
| AVAILABLE FILE<br>TABLE | (variable) |

##### VECTOR FORMAT

|       |     |            |
|-------|-----|------------|
| 0     | 5 6 | 15         |
| ENTRY |     | DST NUMBER |

# Overhead (PXFILE)

The part labeled OVERHEAD contains information that is pertinent to the entire table.

|                                                |   |                         |   |    |
|------------------------------------------------|---|-------------------------|---|----|
| 0                                              | 1 | 7                       | 8 | 15 |
| PXFILE SIZE IN WORDS                           |   |                         |   | 0  |
| LAST DOPEN ERROR NUMBER                        |   | LAST COPEN ERROR NUMBER |   | 1  |
| N                                              |   |                         |   | 2  |
| LAST DF AFT                                    |   | SLAVE AFT NUMBER        |   | 3  |
| LAST KOPEN ERROR NUMBER                        |   | LAST FOPEN ERROR NUMBER |   | 4  |
| AFT SIZE IN WORDS                              |   |                         |   | 5  |
| CS TRACE FILE INFO                             |   |                         |   | 6  |
| LAST RESPONDING NO-WAIT I/O AFT ENTRY NUMBER   |   |                         |   | 7  |
| 1st USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 8  |
| 2nd USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 9  |
| 3rd USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 10 |
| 4th USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 11 |
| 5th USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 12 |
| 6th USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 13 |
| 7th USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 14 |
| 8th USER (NOCB) CONTROL BLOCK TABLE DST NUMBER |   |                         |   | 15 |

In general the following identifiers are used when referring to this part of the PXFILE area:

## DEFINE

```

PXFSIZE = PXFILE#, <<PXFILE SIZE>>
PXDSOPENERR = PXFILE(1).(0:8)#, <<LAST DOPEN ERROR CODE>>
PXCOPENER = PXFILE(1).(8:8)#, <<LAST COPEN ERROR CODE>>
PXFNOCB = PXFILE(2).(0:1)#, <<NO CB'S IN PXFILE CBT?>>
PXLASTDSAFT = PXFILE(3).(0:8)#, <<DSNUM OF LAST DS OPEN>>
PXSLAVEAFT = PXFILE(3).(8:8)#, <<DSNUM OF SLAVE PTOPT DSOPEN>>
PXFKOPEN = PXFILE(4).(0:8)#, <<LAST KOPEN ERROR CODE>>
PXFFOPEN = PXFILE(4).(8:8)#, <<LAST FOPEN ERROR CODE>>
PXFAFTSIZE = PXFILE(5)#, <<AFT SIZE IN WORDS>>
PXFCRINFO = PXFILE(6)#, <<CS TRACE FILE INFO>>
OVERHEAD (CONT.)

```



```

PXLEFTOFF = PXFILE(7)#, <<LAST RESPONDING AFT NR.>>
PXFCBT1 = PXFILE(8)#, <<1ST USER CBT DST NR.>>
PXFCBT2 = PXFILE(9)#, <<2ND USER CBT DST NR.>>
PXFCBT3 = PXFILE(10)#, <<3RD USER CBT DST NR.>>
PXFCBT4 = PXFILE(11)#, <<4TH USER CBT DST NR.>>
PXFCBT5 = PXFILE(12)#, <<5TH USER CBT DST NR.>>
PXFCBT6 = PXFILE(13)#, <<6TH USER CBT DST NR.>>
PXFCBT7 = PXFILE(14)#, <<7TH USER CBT DST NR.>>
PXFCBT8 = PXFILE(15)#; <<8TH USER CBT DST NR.>>

```

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

#### PXFAFTSIZE

This is the size (in words) of the Available File Table. Note that the size is in words and not in terms of number of entries. The reason for this is that it simplifies the calculation for the size of the available block.

#### PXFCBT1-8

These are the DST numbers of the user (NOCB) control block tables. A DST number of 0 indicates that no data segment is allocated. Note that a DST number is representable with ten bits; a full word is used to simplify the code.

#### PXFCOPEN

This contains the last COPEN error number. It is not used by the file system; it is included here for completeness only.

#### PXFCTRINFO

This contains information pertinent to the CS trace file. It is not used by the file system; it is included here for completeness only.

#### PXFDOPEN

This contains the last DOPEN error number. It is not used by the file system; it is included here for completeness only.

#### PXFDSINFO

This cell is reserved for DS. It is not used by the file system; it is included here for completeness only.

#### PXFFOPEN

This contains the last FOPEN error number. If it is zero then the last FOPEN completed successfully; if it is non-zero then the last FOPEN completed unsuccessfully and the number represents the file system error number. Note that only eight bits are needed to hold the error number; a full word is used to simplify the code.

## OVERHEAD (CONT.)

-----

### PXFKOPEN

This contains the last "KOPEN" error number. Since KSAM is imbedded in the file system, an FOPEN failure on a KSAM file can be caused by a failure to open either the key file or the data file. This error number is used in conjunction with PXFFOPEN to determine which file caused the KSAM open failure. Note that this error number is not used by the file system; it is included here for completeness only.

### PXLEFTOFF

This is the AFT entry number of the last file/line that completed a no-wait I/O; if zero then no no-wait I/O has been completed. This cell is maintained solely by and for the IOWAIT intrinsic.

### PXFNOCB

This bit is used to signify that no control blocks are to be created in the PXFILE control block table. This bit is set by the NOCB parameter to the CREATE intrinsic or the :RUN command. The reason for this feature is to permit the 3000/20 user to have as much stack space as possible; otherwise the MPE/30 file system will take away several hundred words of stack for the PXFILE control block table.

### PXFSIZE

This is the size (in words) of the complete PXFILE area. It is the sum of the overhead block, the control block table, the available file table and the available block.

## Control Block Table (PXFILE)

The part labeled CONTROL BLOCK TABLE contains a file control block table. This is a new feature with MPE/30; it is not present under MPE/20.

The format of the control block table is the same as any other file control block table. The only difference is that addressing is slightly more complicated since the table does not begin at DB+0. As a result all pointers within the table are table relative; the starting address of the table must be added to a pointer to generate a final DB-relative address. This addressing convention is consistently applied to all file control block tables. When the control block table is expanded, space is taken from

the AVAILABLE area. If no space is available then the PXFILE area is expanded and the acquired space is added to the AVAILABLE area.

The interested reader is referred to section 3.2 of chapter 6 for a more detailed description of file control block tables.

|   |                             |    |
|---|-----------------------------|----|
| 0 |                             | 15 |
|   | TABLE SIZE IN WORDS         | 16 |
|   | DST NUMBER CONTAINING TABLE | 17 |
|   | VECTOR TABLE SIZE IN WORDS  | 18 |
|   | LOCK WORD                   | 19 |
|   | IMPEDED QUEUE               | 20 |
|   | VECTOR TABLE                | 21 |
|   | CONTROL BLOCK AREA          |    |

In general the following identifiers are used when referring to this part of the PXFILE area:

```

DEFINE
PXFCBTAB = PXFILE(16)#, <<CONTROL BLOCK TABLE>>
PXFCBTSIZE = PXFILE(16)#, <<TABLE SIZE IN WORDS>>
CONTROL BLOCK TABLE (CONT.)

```

```

PXFDSTX = PXFILE(17)#, <<TABLE DST NUMBER>>
PXFVTSIZE = PXFILE(18)#, <<VECTOR TABLE SIZE IN WORDS>>
PXFLOCK = PXFILE(19)#, <<TABLE LOCK WORD>>
PXFQUEUE = PXFILE(20)#, <<TABLE IMPEDED QUEUE>>
PXFVT = PXFILE(21)#; <<VECTOR TABLE>>

```

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

#### PXFCBTAB

This is the first word of the control block table. In general this is used only when referring to the entire control block table.

#### PXFCBTSIZE

This is the size in words of the control block table. In general this is used only when calculating the size of the available block.

#### PXFDSTX

This is the DST number of the data segment that contains the control block table. This is the same as the DST number of the stack. Note that the convention of referring to the DST number of the stack as zero is not used. The reason for this is that the file system may refer to a PXFILE control block table in another stack. This would result in an ambiguity since that PXFILE control block table would also have a DST number of zero.

#### PXFLOCK

This is the lock word for the table and has the same format as the lock word for a control block in the table.

#### PXFQUEUE

This is the impeded queue for the table and has the same format as the impeded queue for a control block in the table.

#### PXFVT

This is the first word of the vector table. It is used when referring to the vector table in general.

#### PXFVTSIZE

This is the size, in words, of the vector table. Note that this is the length of the table and does not reflect the number of entries used or unused.

#### Available Block (PXFILE)

-----

The part labeled AVAILABLE BLOCK is used to provide space when the Control Block Table or the Available File Table is expanded. These two tables grow towards each other, and when more space is needed it is simply taken from the Available Block.

When the Available Block is exhausted, the PXFILE area is expanded, the AFT is relocated and the new space is added to the Available Block.

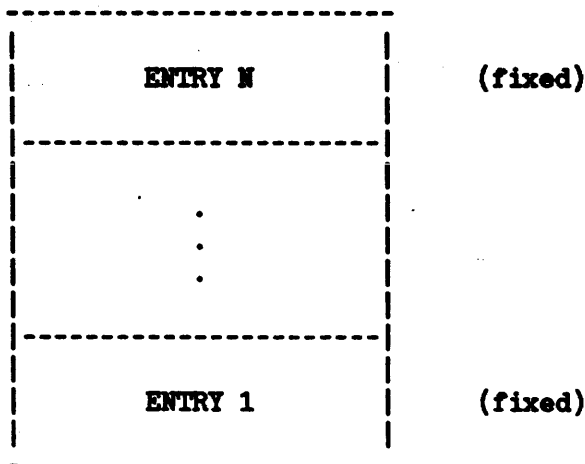
Note that currently the PXFILE area is only expanded; it is never contracted.

#### Available File Table, AFT (PXFILE)

-----

The part labeled AVAILABLE FILE TABLE contains information used by the file system (or CS, DS, etc.) to grossly characterize the file access and, most importantly, to give the location of the control blocks.

The overall structure of the AFT is:



where  $N = \text{PXFAFTSIZE}/4$ .

The AFT is as long as specified by PXFAFTSIZE. Unused entries are all zero's. When the table is full it is expanded by taking space from the AVAILABLE block.

The AFT is negatively indexed by file number: the entry at DL-8 corresponds to file number 1, the entry at DL-12 corresponds to file number 2, etc.

# AFT (CONT.)

---

The structure of an AFT entry is:

| 0                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |   |
|---------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|---|
| ENTRY TYPE          |   |   |   | N |   |   |   |   |   |    |    |    |    |    |    | 0 |
| PHYSICAL ACB VECTOR |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 1 |
| LOGICAL ACB VECTOR  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 2 |
| NO-WAIT I/O IOQX    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 3 |

Note that the entry format is dependent on the entry type. The one shown above is the one used by the file system.

In general the following identifiers are used when referring to an AFT entry:

```

DEFINE
AFTTYPE = AFT.(0:4)#, <<ENTRY TYPE>>
AFTNULL = AFT.(4:1)#, <<$NULL FILE>>
AFTPACBV = AFT(1)#, <<PACB VECTOR>>
AFTLACBV = AFT(2)#, <<LACB VECTOR>>
AFTIOQX = AFT(3)#; <<NO-WAIT I/O IOQX>>

```

## AFT (CONT.)

---

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

### AFTIOQX

This is the IOQ index of the pending no-wait I/O (if any). Note that this is applicable iff the file was opened with the NOWAIT option specified. Also, CS and DS have the same capability and use this cell in a consistent manner. The reason for this is that the IOWAIT intrinsic services the file system as well as CS and DS, and is the principal user of this cell. If the cell is zero then there is no I/O pending; otherwise the cell contains the IOQ index corresponding to the pending I/O.

Exception: a nonzero value for message files specifies the accessors reply port (instead of an IOQ entry).

### AFTLACBV

This is the vector of the Logical ACB (LACB) (if any). Note that this is applicable iff the file was opened with the multi-access option specified.

### AFTNULL

This bit signifies that the file is \$NULL and that there are no control blocks.

### AFTPACBV

This is the vector of the Physical ACB (PACB). Note that a PACB exists for all files except \$NULL.

### AFTTYPE

This is the AFT entry type number. At present the following entry types are defined:

- 0 - file system
- 1 - remote file
- 2 - DS (no-wait I/O disallowed)
- 3 - DS (no-wait I/O allowed)
- 4 - CS
- 5 - CS (AUTO DIAL)
- 6 - KSAM
- 7 - 3270
- 8 - message file

# PCBX FOR CORE RESIDENT SYSTEM PROCESS STACKS

|    |                                 |    |         |
|----|---------------------------------|----|---------|
| 0  | DL-a (Seq Rel DL Value)         | 0  |         |
| 1  | DB-a (Seq Rel DB Value)         | 1  |         |
| 2  | USER ATTRIBUTES (always -1)     | 2  |         |
| 3  | 0   INPUT DEV LDEV              | 3  | PXGLOB  |
| 4  | 0   OUTPUT DEV LDEV             | 4  |         |
| 5  | 0                               | 5  |         |
| 6  | 0   D   I   0                   | 6  |         |
| 7  | 0                               | 7  |         |
| 10 | PXFIXED SIZE (c-b)              | 8  |         |
| 11 | RELATIVE S (S-DB)               | 9  |         |
| 12 | RELATIVE Z (Z-DB)               | 10 |         |
| 13 | INITIAL Q (Q-DB)                | 11 |         |
| 14 | RELATIVE DL (DB-DL)             | 12 | PXFIXED |
| 15 | GENERAL RESOURCE CAPABILITY(-1) | 13 |         |
| 16 | RESERVED                        | 14 |         |
| 17 | 0                               | 15 |         |
| 20 | DL-c                            | 16 |         |
| 21 | DL-b                            | 17 |         |
| 22 | DL-a                            | 18 |         |

- NOTES: 1. there is no PXFILE area.  
2. the PXFIXED area is much smaller than a normal PCBX.



## PROCESS TO PROCESS COMMUNICATION TABLE

-----

This table is used as the communication link by which father and son processes communicate with one another via the mailbox scheme. This table contains two words per entry and is indexed by PCB# (entry index 0 is meaningless). Each two word entry of index N essentially relates where, as well as how much, mail may be found for a process N with respect to communications between N and his father process.

### ENTRY FORMAT

-----

|        |                             |
|--------|-----------------------------|
| word 0 | ----- <br>WORD COUNT        |
| word 1 | ----- <br>MAIL WORD OR DST# |

where word 0 = the # of mail words to  
be transferred.  
word 1 = the only word of mail  
itself if word 0 = 1  
otherwise  
it contains the DST# of  
the extra data segment  
where "word count" words  
of mail exist.

NOTE: Assume process S is the son of process F. Then the process to process communication table index which will be used for mailbox communication between son S and father F will be that of the son (i.e. S).

# SUB-SYSTEM RESERVED DL AREA

## REMAINING DL AREA

|       |                                     |       |
|-------|-------------------------------------|-------|
| DB-12 | RESERVED FOR SORT/MERGE             | DB-10 |
| DB-11 | RESERVED FOR TRACE & TOOLBOX        | DB-9  |
| DB-10 | EXTERNAL PLABEL OF OUTER BLOCK      | DB-8  |
| DB-7  | RESERVED FOR TRACE & SYMBOLIC DEBUG | DB-7  |
| DB-6  | DB ADDRESS OF STLT                  | DB-6  |
| DB-5  | RESERVED FOR COBOL                  | DB-5  |
| DB-4  | RESERVED FOR COBOL                  | DB-4  |
| DB-3  | RESERVED FOR COBOL                  | DB-3  |
| DB-2  | RESERVED FOR FORMATTER & PASCAL     | DB-2  |
| DB-1  | DB ADDRESS OF FLUT                  | DB-1  |

## DB AREA

.....

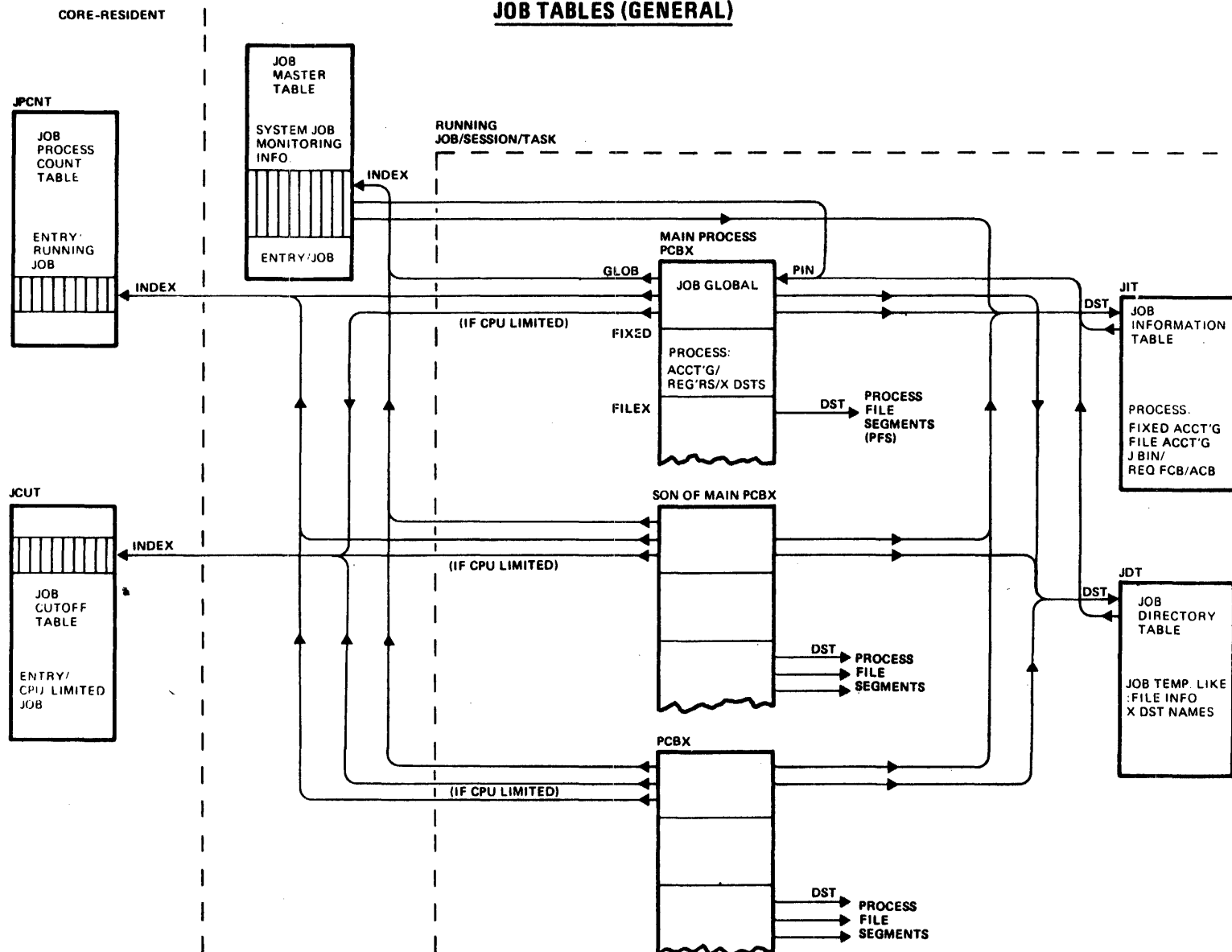
The FLUT is formatted as per the following example:

7-27



## JOB TABLES OVERVIEW

## JOB TABLES (GENERAL)



# JMAT - JOB MASTER TABLE STRUCTURE

SIR = 15(10) = %17

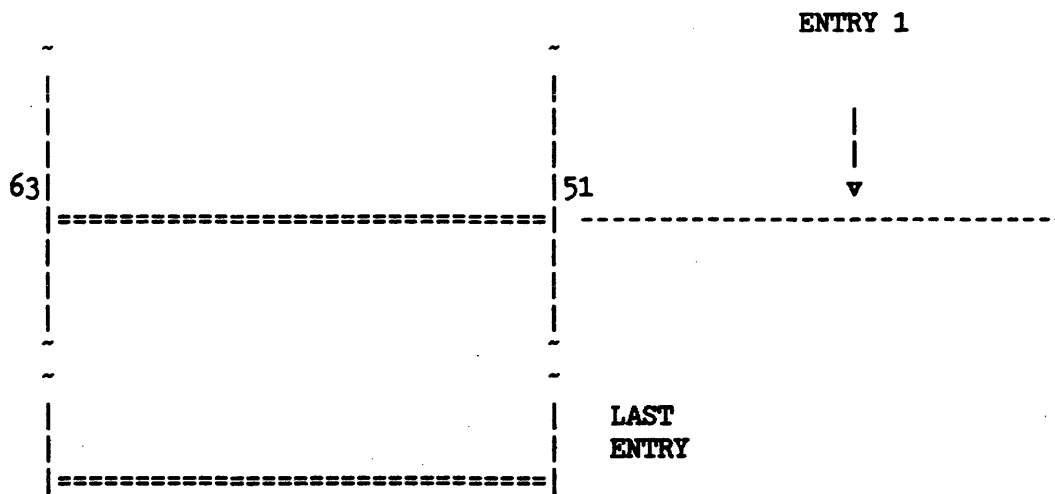
DST = 25(10) = %31

ZEROETH  
ENTRY

| 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
|---------------------------------------|-------------------------|----------|-----------|--|--|--|--|------------|--|--|--|--|--|--|---|-------------------------------|------------------------------------|--|--|
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 0                                     | MAXSIZE                 |          |           |  |  |  |  | CURSIZE    |  |  |  |  |  |  | 0 | max JMAT size (words/128)     |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 1                                     | VMOUNT INFO             |          |           |  |  |  |  | ENTRY SIZE |  |  |  |  |  |  | 1 | current JMAT size (words/128) |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 2                                     | ENTRY POINTER           |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 2                             | :VMOUNT state saved for WARMSTARTs |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 3                                     | SCHEDULING HEAD POINTER |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 3                             | JMAT entry size (26)               |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 4                                     | SCHEDULING TAIL POINTER |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 4                             | DB pointer to first entry (26)     |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 5                                     | TY                      | SCOUNTER |           |  |  |  |  |            |  |  |  |  |  |  |   | 5                             | DB pointer to word 0 of head       |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 6                                     | TY                      | JCOUNTER |           |  |  |  |  |            |  |  |  |  |  |  |   | 6                             | entry in scheduling queue          |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 7                                     | LG                      | SEC      | JOB FENCE |  |  |  |  |            |  |  |  |  |  |  | 7 | DB pointer to word 0 of tail  |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 10                                    | SLIMIT                  |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 8                             | entry in scheduling queue          |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 11                                    | SNUM                    |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 9                             | next assignable session #, TY=1    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 12                                    | JLIMIT                  |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 10                            | next assignable batch #, TY=2      |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 13                                    | JNUM                    |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 11                            | LG=1, logoff in progress           |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 14                                    |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 12                            | SEC=0,high;=3,low JOBSECURITY      |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 15                                    | WORKAREA                |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 13                            | maximum number sessions C E        |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 16                                    | (14WDS)                 |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 14                            | \ U X                              |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 31                                    |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 25                            | current number sessions   R E      |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
| 32                                    |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | 26                            | R C                                |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               | maximum # batch jobs > E U         |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               | N T                                |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               | current # batch jobs   T I         |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               | / L N                              |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               | Y G                                |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   | -----                         |                                    |  |  |
|                                       |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |
| -----                                 |                         |          |           |  |  |  |  |            |  |  |  |  |  |  |   |                               |                                    |  |  |

JMAT (CONT.)

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### SCHEDULING QUEUE

-----

#### WAITING SESSIONS

FIFO WITHIN HIPRI/INPUT PRIORITY

[ERROR JOBS ]

[ FIFO ]

#### WAITING JOBS

FIFO WITHIN HIPRI/INPUT PRIORITY

# JMAT - Job Master Table Entry

|                                 |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
|---------------------------------|--------------------------------|--------------------|-----------|---|---|---|---|---|-------|------------------------|---|--------------|--|--|--|--|--|--|
| 1 1 1 1 1 1                     |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 0                               | state                          | :                  | D         | I | G | A | U | C | INPRI |                        |   |              |  |  |  |  |  |  |
| 1                               | ty:                            | job/session number |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 2                               | user name                      |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 3                               |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 4                               |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 5                               |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 6                               | account name                   |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 7                               |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 10                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 11                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 12                              | job name                       |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 13                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 14                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 15                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 16                              | group logon name               |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 17                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 20                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 21                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 22                              |                                |                    |           |   |   |   |   |   |       | JIN device             | : | JLIST device |  |  |  |  |  |  |
| 23                              |                                |                    |           |   |   |   |   |   |       | Julian date (CALENDAR) |   |              |  |  |  |  |  |  |
| 24                              | time (CLOCK)                   |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 25                              |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 26                              |                                |                    |           |   |   |   |   |   |       | main pin               | : | XPRI         |  |  |  |  |  |  |
| 27                              | CPU lim. (0 deflt, -1 no lim.) |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 30                              | S R:N:FT                       | :                  | OUTPRI    | : |   |   |   |   |       | NUMCOPIES              |   |              |  |  |  |  |  |  |
| 31                              | ORIGJIN                        | :                  | ORIGJLIST |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |
| 1 1 1 1 1 1                     |                                |                    |           |   |   |   |   |   |       |                        |   |              |  |  |  |  |  |  |

|    |                                                                                                                                 |
|----|---------------------------------------------------------------------------------------------------------------------------------|
| 0  | state                                                                                                                           |
| 0  | = free entry                                                                                                                    |
| 1  | = introduced, in STARTDEVICE                                                                                                    |
| 2  | %40 = waiting, job in scheduling queue                                                                                          |
| 3  |                                                                                                                                 |
| 4  | %60 = initial, UCOP has created JSMP                                                                                            |
| 5  |                                                                                                                                 |
| 2  | = executing, JSMP finished initial.                                                                                             |
| 6  |                                                                                                                                 |
| 3  | = terminating.                                                                                                                  |
| 7  |                                                                                                                                 |
| 4  | = suspended.                                                                                                                    |
| 8  |                                                                                                                                 |
| D  | = duplicative                                                                                                                   |
| 9  |                                                                                                                                 |
| I  | = interactive                                                                                                                   |
| 10 | {G = group password                                                                                                             |
| 11 | {(QUIET mode, if state=2)                                                                                                       |
| 12 | {A = account password                                                                                                           |
| 13 | {U = user password                                                                                                              |
| 14 | {0 = password validated (STARTDEVICE)                                                                                           |
| 15 | {1 = must validate                                                                                                              |
| 16 | { password (INITJSMP)                                                                                                           |
| 17 |                                                                                                                                 |
| 18 | C = JLIST is device class index                                                                                                 |
| 19 |                                                                                                                                 |
| 20 | ty = 1 - session                                                                                                                |
| 21 | 2 - job                                                                                                                         |
| 22 |                                                                                                                                 |
| 23 |                                                                                                                                 |
| 24 | ORIGJIN/ORIGJLIST is used as a scheduling link by UCOP (state= %40). DB rel. ptr. to next entry. Last entry in list contains 0. |
| 25 |                                                                                                                                 |

S = ORIGJIN is spooled.  
R = RESTART  
N = SEQUENCED

FT = funny terminal  
00 - regular term.  
01 - regular term.,  
special logon  
10 - APL term.  
11 - APL term.



# JOB STATES

JOB STATES - JMAT ENTRY WORD 0.(0:6)

SHOWJOB - Displays job states by scanning JMAT DST (%31)

LOGON USES ALL STATES EXCEPT "SUSPEND"

| STATE NO. | STATE NAME               | PROCESS                   | SEGMENT                       | PROCEDURE(S)                                                       |
|-----------|--------------------------|---------------------------|-------------------------------|--------------------------------------------------------------------|
| 1         | INTRO                    | DEVREC<br>JSMP<br>SPOOLER | NURSERY                       | STARTDEVICE ->PUTJMAT<br>->ALLOCENTRY IN SEGMENT<br>ALLOCUTIL      |
| %40       | WAIT                     | DEVREC<br>JSMP<br>SPOOLER | NURSERY<br>\<br>SPOOLING<br>/ | STARTDEVICE ->SCHEDULEJOB<br>SPOOLSTUFFIN ->SCHEDULEJOB            |
| %60       | INIT-<br>IALIZAT-<br>ION | UCOP                      | UCOP                          | LAUNCHJOB                                                          |
| 2         | EXEC                     | JSMP                      | NURSERY                       | INITJSMP                                                           |
| 3         | TERMIN-<br>ATING         | JSMP                      | MORQUE                        | TERMINATE ->EXPIRE -><br>CLEANUPJOB                                |
| 0         | FREE<br>ENTRY            | JSMP                      | MORQUE                        | TERMINATE ->EXPIRE -><br>CLEANUPJOB ->DEALLOCENTRY<br>IN ALLOCUTIL |
| 4         | SUSP                     | JSMP                      | OPLOW                         | CXBREAKJOB                                                         |

For states INTRO and WAIT,

DEVREC ==> logon command originated on terminal or  
other unspooled device.  
SPOOLER ==> logon command originated on spooled device.  
JSMP ==> logon command is the result of the execution of  
a :STREAM command. (This also includes USER  
processes which have done programmatic :STREAMs.)

# JPCNT - JOB PROCESS COUNT TABLE

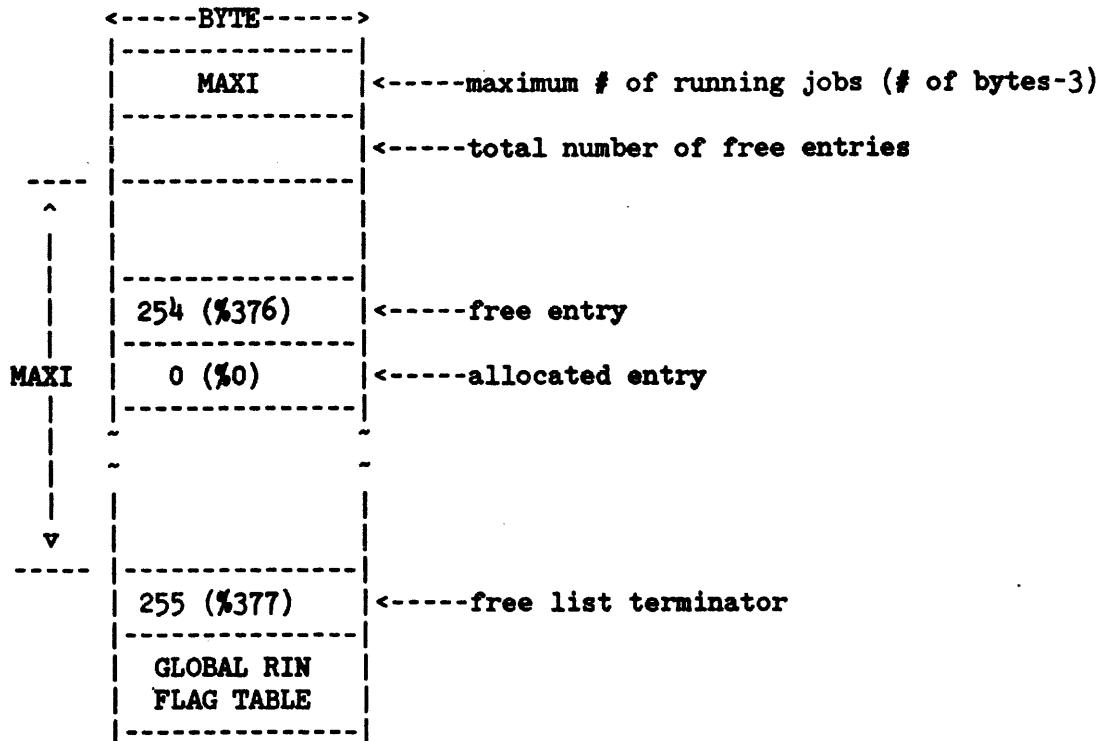
(1 Entry/Running Job)

## CORE RESIDENT

SYSGLOB BASE = DB+13(%15)

DST = 24(10)

SIR = 13(10)



A JPCNT entry must be allocated before the main process can be procreated.

The job SIR (PXGJSIR) = some base+JPCNT index.

NOTE: This table is completely byte oriented with each entry consisting of one byte. Entries are taken from available pool on a "first found" basis. 254 (376 octal) in a byte denotes a free entry. 255 (377 octal) denotes the end of table.

## GLOBAL RIN FLAG TABLE

This table is a bit table which immediately follows the "free list terminator" byte. It is initialized to 0 and is indexed by JPCNT index for each job. When any process in a job/session locks a global rin, the appropriate bit is turned on.

# JCUT - JOB CUTOFF TABLE

1 Entry/ CPU-limited Job

## CORE RESIDENT

SYSGLOB BASE = DB+11(%13)  
DST = 36(10)  
SIR = 14(10)  
SYSGLOB + %117 = default  
CPU time limit for jobs

|     | 0                                            | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8              | 9  | 10 | 11 | 12 | 13 | 14 | 15 |               |
|-----|----------------------------------------------|----|----|----|----|----|----|----|----------------|----|----|----|----|----|----|----|---------------|
|     | --                                           | -- | -- | -- | -- | -- | -- | -- | --             | -- | -- | -- | -- | -- | -- | -- | -----         |
|     | FREE HEAD                                    |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     | # OF REAL ENTRIES                            |    |    |    |    |    |    |    | ENTRY SIZE (3) |    |    |    |    |    |    |    | HEADER ENTRY  |
|     | POINTER TO LAST ENTRY (0)                    |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | -----         |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | TYPICAL ENTRY |
|     | JCUTCPU                                      |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | time limit    |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | (seconds)     |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     | JCUTCPU                                      |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | time count    |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | (msec)        |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | -----         |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
| --> | POINTER TO NEXT FREE ENTRY (END OF LIST = 0) |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | FREE ENTRY    |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    | -----         |
| --> | LAST ENTRY                                   |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |
|     |                                              |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |               |

# JIT -Job Information Table

JIT DST is word 6 in PXGLOB

|                                 |                             | 1 | 1 | 1 | 1 | 1 | 1  |
|---------------------------------|-----------------------------|---|---|---|---|---|----|
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                             |   |   |   |   |   |    |
| 0                               | not used - 0                |   |   |   |   |   | 0  |
| 1                               | 6 : JIT DST                 |   |   |   |   |   | 1  |
| 2                               | pointer to job info 8       |   |   |   |   |   | 2  |
| 3                               | pointer to acct info 48     |   |   |   |   |   | 3  |
| 4                               | pointer to reserved area 59 |   |   |   |   |   | 4  |
| 5                               | association table index     |   |   |   |   |   | 5  |
| 6                               | not used                    |   |   |   |   |   | 6  |
| 7                               |                             |   |   |   |   |   | 7  |
| 10                              |                             | 7 |   |   |   |   | 8  |
| 11                              | ty : job number             |   |   |   |   |   | 9  |
| 12                              | JITMAXP : JITMPN            |   |   |   |   |   | 10 |
| 13                              | EOF: not used               |   |   |   |   |   | 11 |
| 14                              | DS DATASEG                  |   |   |   |   |   | 12 |
| 15                              | JITASEC                     |   |   |   |   |   | 13 |
| 16                              | JITGSEC                     |   |   |   |   |   | 14 |
| 17                              | group security              |   |   |   |   |   | 15 |
| 20                              |                             |   |   |   |   |   | 16 |
| 21                              | JITHAN                      |   |   |   |   |   | 17 |
| 22                              | account name                |   |   |   |   |   | 18 |
| 23                              |                             |   |   |   |   |   | 19 |
| 24                              |                             |   |   |   |   |   | 20 |
| 25                              | JITHGN                      |   |   |   |   |   | 21 |
| 26                              | home group                  |   |   |   |   |   | 22 |
| 27                              |                             |   |   |   |   |   | 23 |
| 30                              |                             |   |   |   |   |   | 24 |
| 31                              | JITLGN                      |   |   |   |   |   | 25 |
| 32                              | log-on group                |   |   |   |   |   | 26 |
| 33                              |                             |   |   |   |   |   | 27 |
| +                               |                             | + |   |   |   |   |    |
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                             |   |   |   |   |   |    |
|                                 |                             | 1 | 1 | 1 | 1 | 1 | 1  |

ty - 1 = Session  
2 = Job

JITMAXP - MAXJOBPRI capability  
JIIMPN - Job main PIN.  
JITEOF - used by FCLOSE to tell CI  
that a \$STDIN(X) file was closed  
w/out encountering an EOF.  
(0:1)=\$STDIN, (1:1)=\$STDINX

# JIT - Continued

---

|                                 |                        |  |  |  |  |  |    |    |    |
|---------------------------------|------------------------|--|--|--|--|--|----|----|----|
| 1 1 1 1 1 1                     |                        |  |  |  |  |  |    |    |    |
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                        |  |  |  |  |  |    |    |    |
| 34                              |                        |  |  |  |  |  |    |    | 28 |
| 35                              | JITUN                  |  |  |  |  |  |    |    | 29 |
| 36                              | user name              |  |  |  |  |  |    |    | 30 |
| 37                              |                        |  |  |  |  |  |    |    | 31 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 40                              | pointer to JITAIP      |  |  |  |  |  | 53 | 32 |    |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 41                              | P M: pointer to JITGIP |  |  |  |  |  | 55 | 33 |    |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 42                              | LATR                   |  |  |  |  |  |    |    | 34 |
| 43                              | local attributes       |  |  |  |  |  |    |    | 35 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 44                              | PASSF                  |  |  |  |  |  |    |    | 36 |
| 45                              | passed file pointer    |  |  |  |  |  |    |    | 37 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 46                              | UCAP                   |  |  |  |  |  |    |    | 38 |
| 47                              | user capability *      |  |  |  |  |  |    |    | 39 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 50                              |                        |  |  |  |  |  |    |    | 40 |
| 51                              | allow mask             |  |  |  |  |  |    |    | 41 |
| 52                              |                        |  |  |  |  |  |    |    | 42 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 53                              | local RIN pointer      |  |  |  |  |  |    |    | 43 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| 54                              |                        |  |  |  |  |  |    |    | 44 |
| 55                              | JITJN                  |  |  |  |  |  |    |    | 45 |
| 56                              | job name               |  |  |  |  |  |    |    | 46 |
| 57                              |                        |  |  |  |  |  |    |    | 47 |
| -----                           |                        |  |  |  |  |  |    |    |    |
| +                               |                        |  |  |  |  |  |    |    |    |
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                        |  |  |  |  |  |    |    |    |
| 1 1 1 1 1 1                     |                        |  |  |  |  |  |    |    |    |

P - Group's home volume is a private volume  
M - Private volume mounted (i.e. group bound to home volume set), JITGIP = 57

For bit mask definitions, see Allow mask format, Chapter 1.

— — —

```
0|1:2:3|4:5:6|7:8:9|0:1:2|3:4:5
 1 1 1 1 1 1
```

\* THE FORMAT FOR UCAP (%46-47) IS AS FOLLOWS:

[illegible]

# JDT - JOB DIRECTORY TABLE

|            |                                  |                                                                                                                                   |       |       |            |            |    |    |
|------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------|-------|------------|------------|----|----|
| 0          | MAX SEG SIZE(WDS)                | 1 entry per job<br>DST # in PXGLOB                                                                                                |       |       |            |            |    |    |
| 1          | POINTER TO JDSD                  |                                                                                                                                   |       |       |            |            |    |    |
| 2          | POINTER TO JTFD                  |                                                                                                                                   |       |       |            |            |    |    |
| 3          | POINTER TO JFEQ                  |                                                                                                                                   |       |       |            |            |    |    |
| 4          | POINTER TO JLEQ                  |                                                                                                                                   |       |       |            |            |    |    |
| 5          | POINTER TO JJCW                  |                                                                                                                                   |       |       |            |            |    |    |
| 6          | POINTER TO FREE SPACE            |                                                                                                                                   |       |       |            |            |    |    |
|            | WORK AREA<br>15 words            |                                                                                                                                   |       |       |            |            |    |    |
| JDSJNUM    | TY  NUM                          | job number                                                                                                                        |       |       |            |            |    |    |
|            | //////////  JSMPIN               | main process number                                                                                                               |       |       |            |            |    |    |
| JDSD       | JOB DATA<br>SEGMENT DIRECTORY    |                                                                                                                                   |       |       |            |            |    |    |
| JTFD       | JOB TEMPORARY<br>FILE DIRECTORY  | <table><tr><td>ENTRY</td><td>NAME</td></tr><tr><td>SIZE (WDS)</td><td>SIZE (WDS)</td></tr><tr><td>C1</td><td>C2</td></tr></table> | ENTRY | NAME  | SIZE (WDS) | SIZE (WDS) | C1 | C2 |
| ENTRY      | NAME                             |                                                                                                                                   |       |       |            |            |    |    |
| SIZE (WDS) | SIZE (WDS)                       |                                                                                                                                   |       |       |            |            |    |    |
| C1         | C2                               |                                                                                                                                   |       |       |            |            |    |    |
| JFEQ       | JOB FILE<br>EQUATION TABLE       | <table><tr><td>CN</td><td>(%40)</td></tr></table>                                                                                 | CN    | (%40) |            |            |    |    |
| CN         | (%40)                            |                                                                                                                                   |       |       |            |            |    |    |
| JLEQ       | JOB LINE<br>EQUATION TABLE       | ENTRY<br>INFORMATION                                                                                                              |       |       |            |            |    |    |
|            | JOB CONTROL WORD<br>TABLE (JJCW) | The name is a<br>concatenation of up to 3 subnames.<br>Bit 0 of the 1st character of each<br>subname is 1.                        |       |       |            |            |    |    |
|            | FREE SPACE                       |                                                                                                                                   |       |       |            |            |    |    |

# JOB DATA SEGMENT DIRECTORY ENTRY - (IN JDT)

|                              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0                            | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   |
| ----                         | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
|                              |      |      |      | 4    |      |      |      |      |      |      |      |      |      | 1    |      |
| -----                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| SEGMENT ID                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| -----                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| EXTRA DATA SEGMENT DST INDEX |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| -----                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| # OF PROCESSES ACCESSING     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| -----                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

## JOB TEMPORARY FILE ENTRY - (IN JDT)

|                    |   |   |   |   |   |   |   |                   |   |    |    |    |    |    |    |
|--------------------|---|---|---|---|---|---|---|-------------------|---|----|----|----|----|----|----|
| 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8                 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|                    |   |   |   |   |   |   |   |                   |   |    |    |    |    |    |    |
| ENTRY SIZE (WORDS) |   |   |   |   |   |   |   | NAME SIZE (WORDS) |   |    |    |    |    |    |    |
| -----              |   |   |   |   |   |   |   |                   |   |    |    |    |    |    |    |

### NAME-ACTUAL FILE DESIGNATOR

|                    |  |
|--------------------|--|
| -----              |  |
| VOLUME POINTER     |  |
| -----              |  |
| FILE LABEL POINTER |  |
| -----              |  |

----- Name is a  
concatenation of up  
to three subnames.  
Bit 0 of the first  
character of each  
subname is 1.



FILE EQUATION TABLE ENTRY - (IN JDT)

|                                                |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
|------------------------------------------------|---|---|---|---|---|---|---|-----------------------|---|----|----|--------------|----|-----------------|----|
| 0                                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8                     | 9 | 10 | 11 | 12           | 13 | 14              | 15 |
| ENTRY SIZE (WORDS)                             |   |   |   |   |   |   |   | NAME SIZE (WORDS)     |   |    |    |              |    |                 |    |
| NAME<br>(FORMAL DESIGNATOR)                    |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| PMASK                                          |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| NAME LENGTH (BYTES)                            |   |   |   |   |   |   |   | DEVICE LENGTH (BYTES) |   |    |    |              |    |                 |    |
| NAME-ACTUAL DESIGNATOR<br>(may not be present) |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| DEVICE/CLASS NAME<br>(may not be present)      |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| FOPTIONS                                       |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| AOPTIONS                                       |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| #BUFFERS                                       |   |   |   |   |   |   |   | INIT ALLOC            |   |    |    | D T S        |    | <---disposition |    |
| RECORD SIZE                                    |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| # EXTENTS                                      |   |   |   |   |   |   |   | /////////             |   |    |    | BLOCK FACTOR |    |                 |    |
| FILE                                           |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| SIZE                                           |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| FILE CODE                                      |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| OUTPRI                                         |   |   |   |   |   |   |   | NUMCOPIES             |   |    |    |              |    |                 |    |
| REF COUNT                                      |   |   |   |   |   |   |   | # OF USER LABELS      |   |    |    |              |    |                 |    |
| LENGTH FORMS=/LABEL=                           |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |
| FORMS/LABEL<br>ARRAY                           |   |   |   |   |   |   |   |                       |   |    |    |              |    |                 |    |

BIT13 DEL  
BIT14 TEMP  
BIT15 SAVE

# JOB LINE EQUATION ENTRY

|    |                                   |     |                     |          |
|----|-----------------------------------|-----|---------------------|----------|
|    | ENTRY SIZE (WORDS)                |     | DESIG. SIZE (WORDS) |          |
|    | FORMAL<br>LINE DESIGNATOR         |     |                     |          |
|    | (1-4 WORDS)                       |     |                     |          |
| 0  | PMASK1                            |     |                     | 0        |
| 1  | REF CNT                           | 5 P | PMASK2              | 1 P=FLAG |
| 2  | NAME LENGTH                       |     | DEV LENGTH          | 2        |
| 3  |                                   |     |                     | 3        |
| 4  | NAME                              |     |                     | 4        |
| 5  | ( END OF LEQ ENTRY IF NON-BLANK ) |     |                     | 5        |
| 6  |                                   |     |                     | 6        |
| 7  |                                   |     |                     |          |
| 10 | DEVICE                            |     |                     | 8        |
| 11 |                                   |     |                     | 9        |
| 12 |                                   |     |                     | 10       |
| 13 | PMASK3                            |     |                     | 11       |
| 14 | DRIVER NAME LENGTH                |     |                     | 12       |
| 15 |                                   |     |                     | 13       |
| 16 |                                   |     |                     | 14       |
| 17 | DRIVER NAME                       |     |                     | 15       |
| 20 |                                   |     |                     | 16       |
| 21 | LIST PNTR                         |     |                     | 17       |
| 22 | COPTIONS                          |     |                     | 18       |
| 23 | AOPTIONS                          |     |                     | 19       |
| 24 | DOPTIONS                          |     |                     | 20       |

# JLEQ ENTRY (CONT.)

|    |                      |    |              |
|----|----------------------|----|--------------|
| 25 | NUMBER OF BUFFERS    | 21 |              |
| 26 | BUFFER SIZE IN WORDS | 22 |              |
| 27 | INSPEED              | 23 |              |
| 30 |                      | 24 |              |
| 31 | OUTSPEED             | 25 |              |
| 32 |                      | 26 |              |
| 33 | POLL REPEAT          | 27 |              |
| 34 | POLL DELAY           | 28 |              |
| 35 | C TRACE INFO         | 29 |              |
| 36 | LOCAL ID PNTR        | 30 | \            |
| 37 | REMOTE ID PNTR       | 31 |              |
| 40 | SUPLIST PNTR         | 32 | REL TO ORIG  |
| 41 | PHONE LIST PNTR      | 33 | OF LEQ ENTRY |
| 42 | POLLIST PNTR         | 34 |              |
| 43 | MISC ARRAY PNTR      | 35 | /            |

## JJCW JOB CONTROL WORD TABLE

|                   |                                                                                                   |
|-------------------|---------------------------------------------------------------------------------------------------|
| NAME SIZE (BYTES) | Name may be any alpha-numeric string, beginning with an alpha, between 1 and 255 characters long. |
| NAME              |                                                                                                   |
| TY   MODIFIER     | TY 00 = OK<br>01 = WARN<br>10 = FATAL<br>11 = SYSTEM                                              |

MODIFIER = VALUE FROM 0 TO %377777

# AOPTIONS AND FOPTIONS WORD BREAKDOWN

| OPTION WORD 2<br>(AOPTIONS) |     |                 | OPTION WORD 1<br>(FOPTIONS) |     |                |
|-----------------------------|-----|-----------------|-----------------------------|-----|----------------|
| 0                           | --- |                 | 0                           | --- |                |
|                             | 0   |                 |                             | 0   |                |
|                             | 0   |                 |                             | 0   |                |
|                             | 0   |                 |                             | --- |                |
| 3                           | --- | copy            | 2                           |     | file type      |
|                             | --- |                 | 3                           |     |                |
| 4                           | --- | no-wait         | 4                           | 0   |                |
|                             | --- |                 |                             | --- |                |
| 5                           | --- |                 | 5                           | 0   | disallow files |
|                             | --- | multi-          |                             | --- |                |
| 6                           | --- | access          | 6                           |     | labelled tape  |
|                             | --- |                 |                             | --- | carriage       |
| 7                           | --- | inhibit buff.   | 7                           |     | control        |
|                             | --- |                 |                             | --- |                |
| 8                           | --- |                 | 8                           |     |                |
|                             | --- | exclusive       |                             |     | record format  |
| 9                           | --- |                 | 9                           |     |                |
|                             | --- |                 |                             | --- |                |
| 10                          | --- | dynamic locking | 10                          |     |                |
|                             | --- | multi-          |                             |     | default        |
| 11                          | --- | record          |                             |     | designator     |
|                             | --- |                 |                             |     |                |
| 12                          | --- |                 | 12                          |     |                |
|                             | --- |                 |                             | --- |                |
|                             | --- | access type     | 13                          |     | ascii/binary   |
|                             | --- |                 |                             | --- |                |
|                             | --- |                 | 14                          |     |                |
|                             | --- |                 |                             |     | domain         |
| 15                          | --- |                 | 15                          |     |                |
|                             | --- |                 |                             | --- |                |

# PMASK WORD BREAKDOWN

|               |   |  | PMASK WORD 2       |
|---------------|---|--|--------------------|
|               |   |  | PMASK WORD 1       |
|               |   |  | 0                  |
| FILE TYPE     |   |  | BLOCK FACTOR       |
| LABELLED TAPE |   |  | RECSIZE            |
| FRMS MESSAGE  |   |  | DISPOSITION        |
| USER LABELS   |   |  | NUMBUFFERS         |
|               | 4 |  | INHIBIT BUFFERING  |
|               | 5 |  | EXCLUSIVE          |
| POINTER ENTRY |   |  | MULTI-RECORD       |
| DYN.LOCKING   |   |  | ACCESS TYPE        |
| WAIT,NOWAIT   |   |  | COPY,NOCOPY        |
| MULTI ACCESS  |   |  | CARRIAGE CONTROL   |
| NUMCOP        |   |  | RECORD FORMAT      |
| OUTPRI        |   |  | DEFAULT DESIGNATOR |
| FILECODE      |   |  | ASCII/BINARY       |
| FILESIZE      |   |  | DOMAIN             |
| NUMEXTS       |   |  | DEVICE             |
| INIT ALLOC    |   |  | NAME               |
|               |   |  | 15                 |

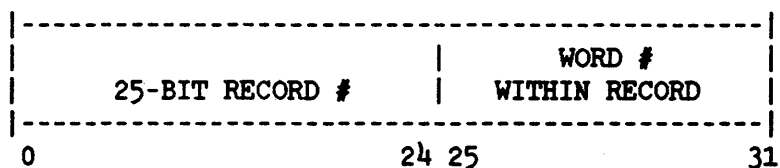
1->info present  
0->info absent



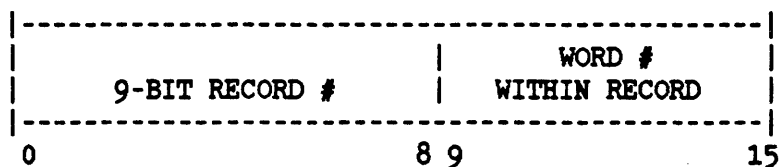
## CHAPTER 9 RELOCATABLE OBJECT CODE

### USL FILES - GENERAL INFO

- \* USL record length 128 words always.
- \* Layout of doubleword disc addresses



- \* Hash links join all entries with the same hash key regardless of type.
- \* Linear lists terminate with a zero link
- \* Circular lists containing only the list head point directly to themselves.
- \* Single-word disc addresses



Uninitialized fields are reserved for future use and should be set to zero.

- \* Hash code of an identifier is a numeric value which is calculated from a double word (containing information relative to the identifier) as follows:

$$\text{HASH CODE} := \begin{array}{c} \begin{array}{ccc} 0 & 7 & 8 & 15 \\ \hline | & \text{NC} & | & \text{CHAR 1} & | \\ \hline | & \text{CHAR} & | & \text{CHAR} & | \\ | & \text{NC-1} & | & \text{NC} & | \\ \hline \end{array} \end{array} \text{MOD } 95$$

where NC = number of characters in identifier  
 CHAR 1 = Binary representation of first ASCII character  
 CHAR NC-1 = Binary representation of next to last ASCII character (set to NC for single character identifier).  
 CHAR NC = Binary representation of last ASCII character (=CHAR1 if single character identifier).

The hash code value is used as an index into the "Hash Bucket array" of record 0.

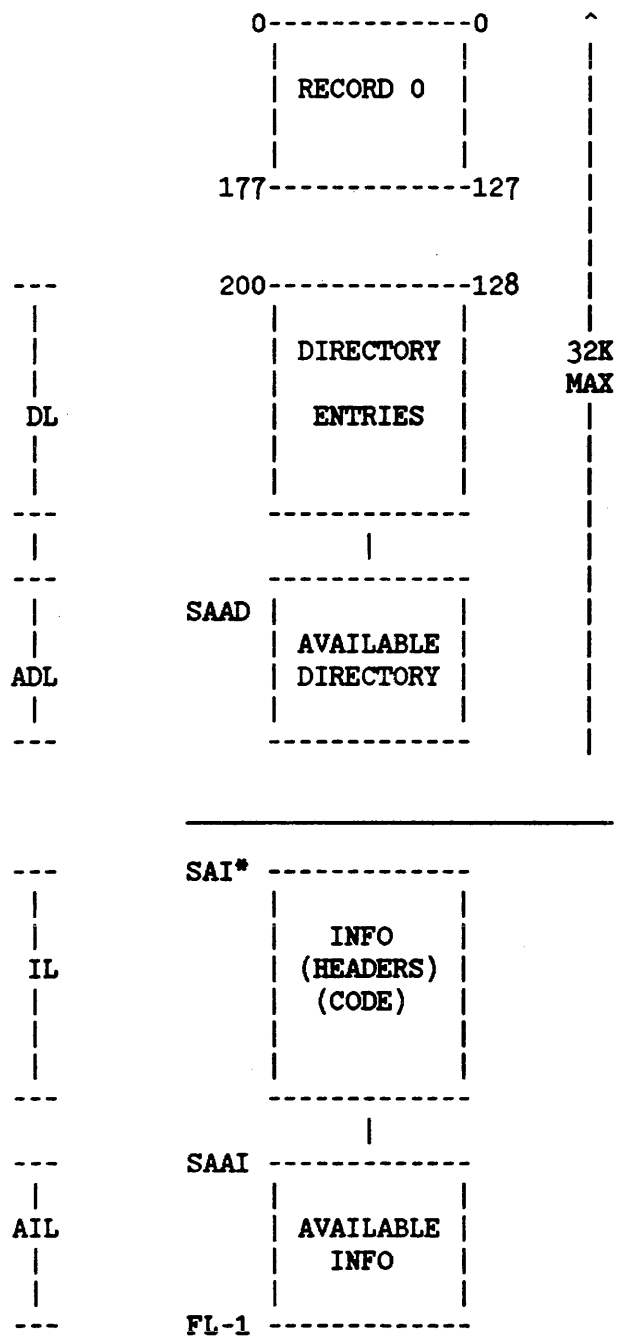


# RECORD 0 AND OVERALL USL FILE FORMAT

|    |       |    |                           |       |
|----|-------|----|---------------------------|-------|
|    |       |    | NOTE:                     |       |
|    |       |    | S.A. = Starting Address   |       |
| 0  | LID   | 0  | LOADER ID                 |       |
| 1  | NE    | 1  | NR. DIRECTORY ENTRIES     |       |
| 2  | DL    | 2  | DIR. LENGTH               |       |
| 3  | SUMDG | 3  | TOTAL DIR. GARBAGE        |       |
| 4  | NDG   | 4  | NR. DIR. GARB. ENTRIES    |       |
| 5  | SABDL | 5  | S.A. BLOCK DATA LIST      |       |
| 6  | SAIPL | 6  | S.A. INTERRUPT PROC. LIST |       |
| 7  | SASL  | 7  | S.A. SEGMENT LIST         |       |
| 10 | FL    | 8  | FILE LENGTH               | ----- |
| 11 |       | 9  |                           |       |
| 12 | SAAD  | 10 | S.A. AVAIL. DIR.          |       |
| 13 | ADL   | 11 | AVAIL. DIR. LENGTH        |       |
| 14 | SAI   | 12 | S.A. INFO BLOCK           |       |
| 15 |       | 13 |                           |       |
| 16 | IL    | 14 | INFO BLOCK LENGTH         |       |
| 17 |       | 15 |                           |       |
| 20 | SAAI  | 16 | S.A. AVAIL. INFO          |       |
| 21 |       | 17 |                           |       |
| 22 | AIL   | 18 | AVAIL. INFO LENGTH        |       |
| 23 |       | 19 |                           |       |
| 24 | TOTAL | 20 | TOTAL INFO GARBAGE        |       |
| 25 | I.G.  | 21 |                           |       |
| 26 | NIG   | 22 | NR. INFO GARB. ENTRIES    |       |
| 27 |       | 23 |                           |       |
| 30 |       | 24 |                           |       |

|     |          |               |
|-----|----------|---------------|
| 31  |          | 25            |
| 32  |          | 26            |
| 33  |          | 27            |
| 34  |          | 28            |
| 35  |          | 29            |
| 36  |          | 30            |
| 37  |          | 31            |
| 40  |          | 32            |
| 41  | HL<br>0  | 33 HASH LINKS |
|     | .        |               |
|     | .        |               |
| 177 | HL<br>94 | 127           |

# USL FILES - GENERAL INFO (CONT.) -----

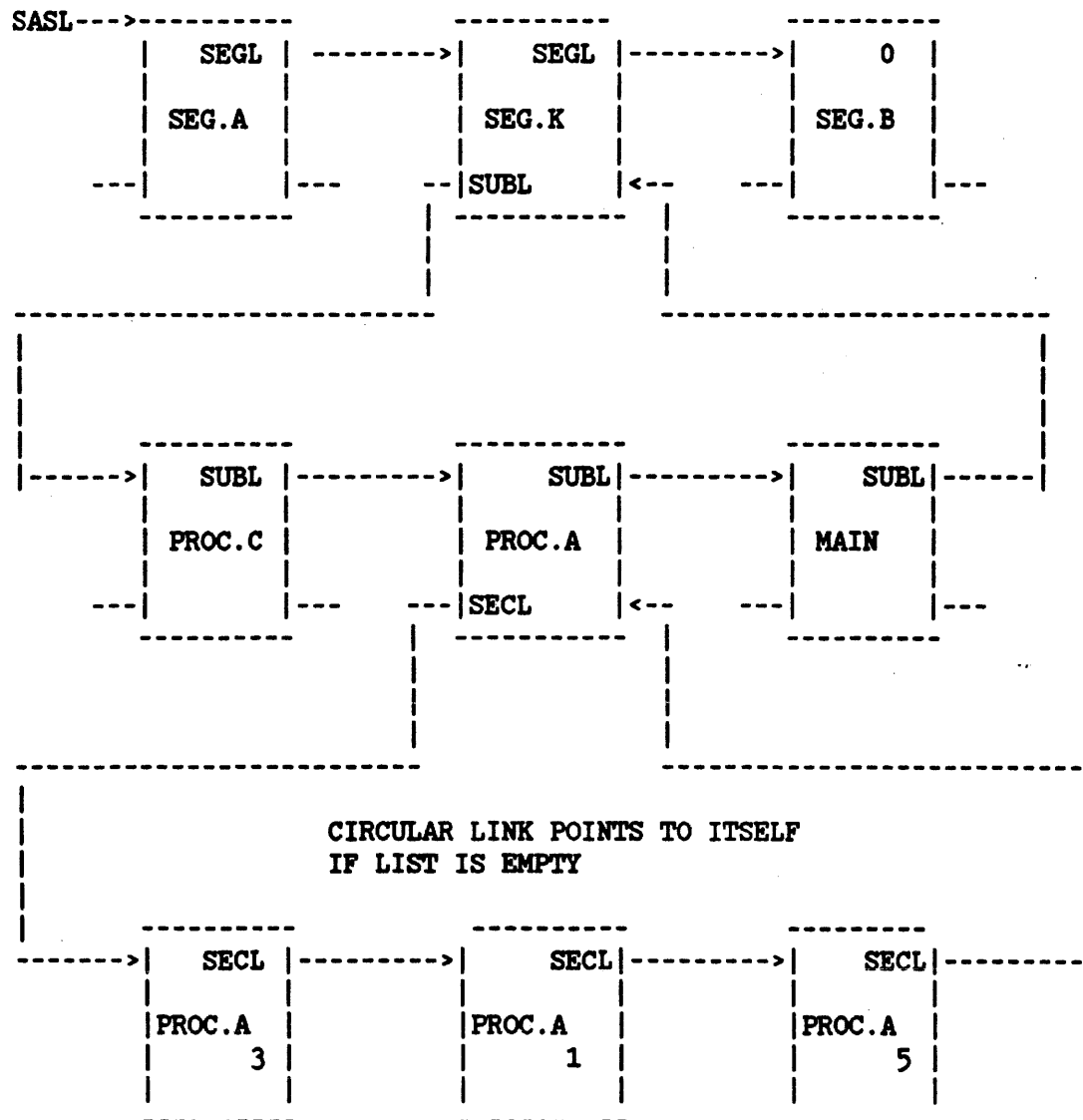


\*SAI MUST BE ON A RECORD BOUNDARY

NOTE: ALL ADDRESSES IN RECORD 0 ARE WORD ADDRESSES.

# USL FILES - GENERAL INFO (CONT.)

## DIRECTORY ENTRY STRUCTURE

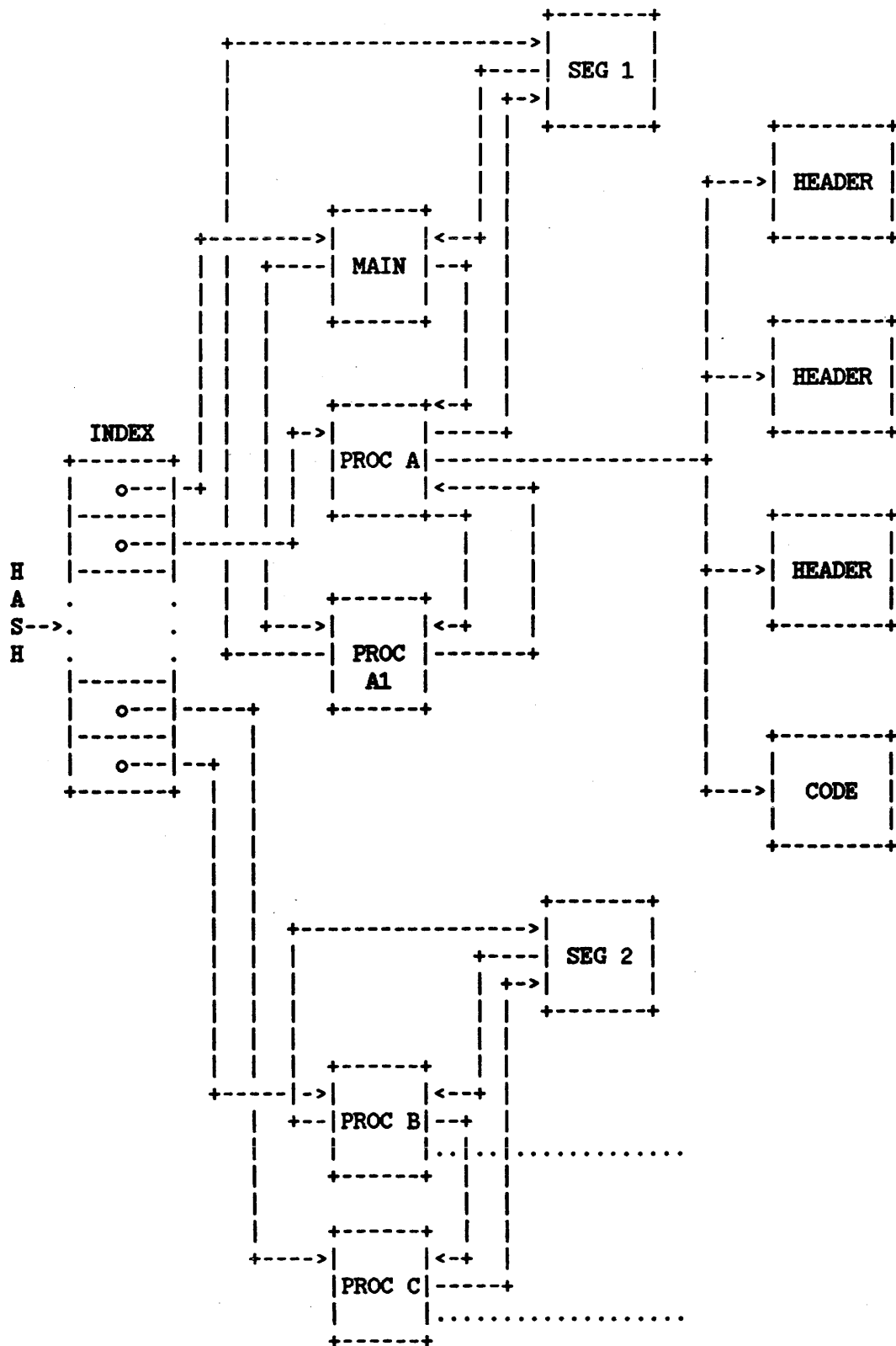


A \  
K >SEGMENT NAME ENTRIES  
B /

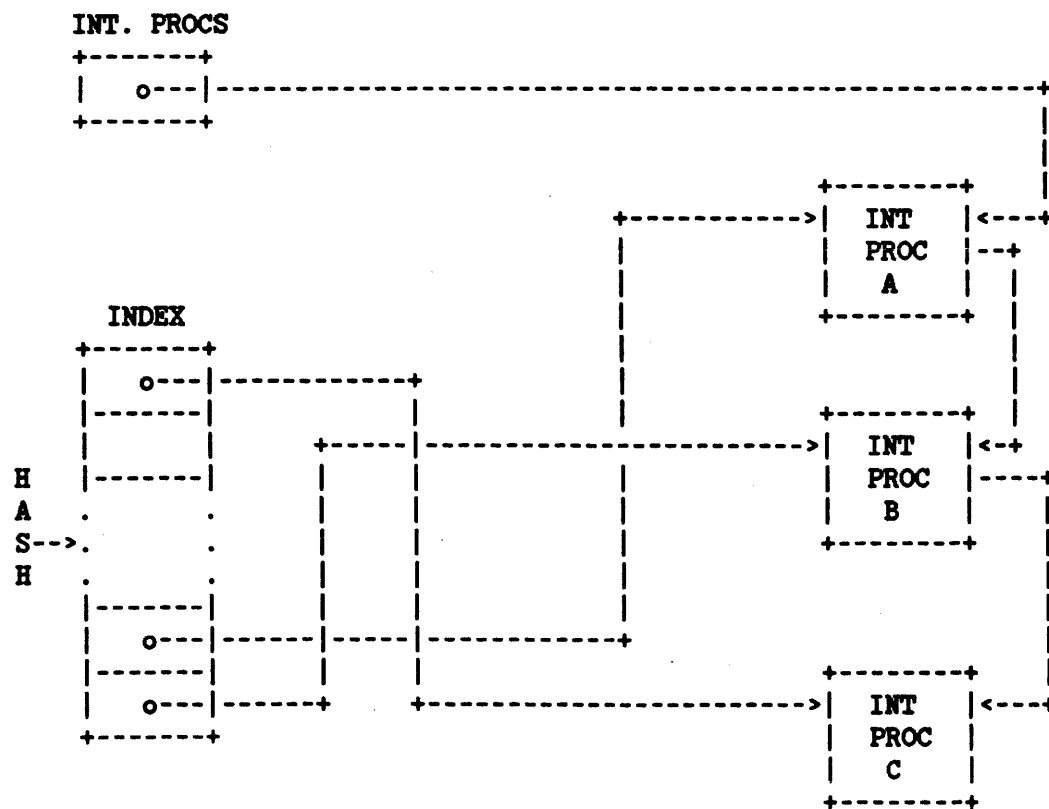
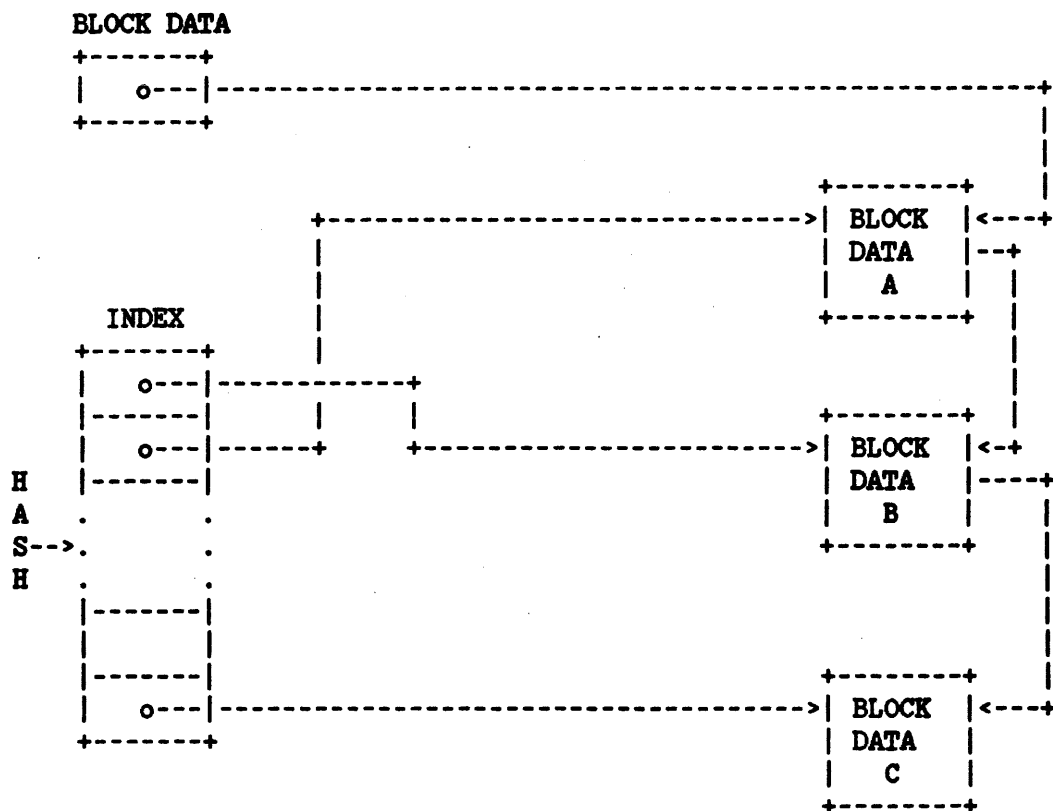
PROC C \  
PROC A >SUBPROGRAM  
MAIN / ENTRIES

A \  
3 |  
A |  
1 } SECONDRY ENTRY POINT ENTRIES  
A |  
5 /

# General Entries



# BLOCK DATA AND INTERRUPT PROCEDURE



# DATA DESCRIPTORS, PASSED PARAMETERS

```

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODE | STRUCTURE | TYPE |

```

| TYPE                         | WORDS | CODE |
|------------------------------|-------|------|
| NULL                         |       | 0    |
| LOGICAL                      | 1     | 1    |
| INTEGER                      | 1     | 2    |
| BYTE                         | 1/2   | 3    |
| REAL                         | 2     | 4    |
| DOUBLE                       | 2     | 5    |
| LONG                         | 3     | 6    |
| COMPLEX                      | 4     | 7    |
| LABEL (SPL)                  |       | 10   |
| CHARACTER                    | N/2   | 11   |
| LABEL (FORTRAN)              |       | 12   |
| UNIVERSAL (MATCHES ANY TYPE) |       | 13   |

## STRUCTURE

|                 |   |
|-----------------|---|
| SIMPLE VARIABLE | 0 |
| POINTER         | 1 |
| ARRAY           | 2 |
| PROCEDURE       | 3 |

## MODE

|           |   |
|-----------|---|
| NULL      | 0 |
| VALUE     | 1 |
| REFERENCE | 2 |
| NAME      | 3 |

NOTE: A descriptor of 0 results in an automatic match.

# DIRECTORY ENTRY TYPE 0

## GARBAGE

| 0       | 1  | 10 | 11 | 15 |                                    |
|---------|----|----|----|----|------------------------------------|
|         | NW |    | 0  |    | NW - Number of words in this block |
| GARBAGE |    |    |    |    |                                    |

# DIRECTORY ENTRY TYPE 1

## SEGMENT NAME

| 0 | 1           | 7     | 8       | 10 | 11    | 15 |                                                                       |
|---|-------------|-------|---------|----|-------|----|-----------------------------------------------------------------------|
|   | NW          |       |         | 1  |       |    | NW - Number of words in entry block                                   |
|   |             |       | HL      |    |       |    | HL - Hash link - points to next entry having the same hash code       |
| A |             | NC    |         |    | CHAR1 |    |                                                                       |
|   | (VARIABLE # | CHAR. | SEE NC) |    |       |    | A - Activity bit<br>0 if active<br>1 if inactive<br>(initialize to 0) |
|   | CHAR. NC    |       |         |    |       |    | Note: An inactive segment implies that all entry points are inactive  |
|   |             |       | SEGL    |    |       |    |                                                                       |
| L |             |       | SUBL    |    |       |    | NC - Number of characters in name. Max is 15                          |

CHAR. 1 - First character in variable field

CHAR. NC - Last character in variable field

SEGL - Segment link - points to next segment name entry (0= End of list)

SUBL - Subprogram link - points to next entry having the same segment name

L - Last entry in list  
0 if not last  
1 if last



# CLARIFICATION NOTES ON ENTRY TYPES 2 AND 4

## WITH RESPECT TO SPL AND FORTRAN

| *ENTRY TYPE 2<br>SPL O.B. | **ENTRY TYPE 4<br>SPL PROC | *ENTRY TYPE 2<br>FORTRAN MAIN | **ENTRY TYPE 4<br>FORTRAN SUB. |
|---------------------------|----------------------------|-------------------------------|--------------------------------|
| TPDB                      | 0                          | 0                             | 0                              |
| 1,5<br>TSDB               | 1<br>TSDB                  | 1,2,3,4<br>TSDB               | 1,2,3,4<br>TSDB                |
| NWPUST                    | NWPUST                     | NWPUST                        | NWPUST                         |
| 5<br>NWSDB                | NWO                        | NWD                           | NWD                            |

WHERE: TPDB = Total primary DB length in words  
 TSDB = Total secondary DB length in words  
 NWPUST = Number of words in "TRACE" array  
 NWSDB = Number of words in secondary DB array  
 NWO = Number of words in own array  
 NWD = Number of words in data array

- Notes: 1. Does not include the length of the STLT  
 2. Does not include the length of the FLUT  
 3. Does not include the length of any common array  
 4. Includes the length of any DB-allocated format array  
 5. Are not necessarily equal

In general TPDB and TSDB are summations of storage allocated in the global area of the program's data segment. They are not, however, complete since the compilers are not aware of all storage actually allocated! The STLT and FLUT are examples of this since these tables are constructed by the segmenter. Common arrays also present a problem since their inclusion in TPDB and TSDB might cause their storage requirements to be counted more than once.

\* See Entry Type 2 Format (Outer Block)

\*\* See Entry Type 4 Format (Procedure).

# DIRECTORY ENTRY TYPE 2

## OUTER BLOCK

| 0                              | 1 | 2 | 3   | 4 | 5 | 6  | 7 | 8      | 10 | 11 | 15 |  |
|--------------------------------|---|---|-----|---|---|----|---|--------|----|----|----|--|
| ///                            |   |   | NW  |   |   |    |   |        |    |    | 2  |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| HL                             |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
| A   C   I                      |   |   | /// |   |   | NC |   | CHAR 1 |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| (VARIABLE # CHAR.SEE NC)       |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| CHAR NC                        |   |   |     |   |   |    |   |        |    |    |    |  |
| ////////////////               |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
| L                              |   |   |     |   |   |    |   |        |    |    |    |  |
| SUBL                           |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
| L                              |   |   |     |   |   |    |   |        |    |    |    |  |
| SECL                           |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| SSA                            |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| SAC                            |   |   |     |   |   |    |   |        |    |    |    |  |
| RELATIVE TO SAI (SEE RECORD 0) |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| F   W                          |   |   | NWC |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| SE                             |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| TPDB                           |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| TSDB                           |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| NWPUST                         |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| NWD/NWSDB                      |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| T                              |   |   | NH  |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| SAH                            |   |   |     |   |   |    |   |        |    |    |    |  |
| RELATIVE TO SAI (SEE RECORD 0) |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |
|                                |   |   |     |   |   |    |   |        |    |    |    |  |
| HDW                            |   |   |     |   |   |    |   |        |    |    |    |  |
| -----                          |   |   |     |   |   |    |   |        |    |    |    |  |

-----

|   |     |
|---|-----|
|   | .   |
|   | .   |
|   | .   |
|   | HDW |
|   | .   |
|   | .   |
|   | .   |
| T | NH  |
|   | SAH |
|   | HDW |
|   | .   |
|   | .   |
|   | .   |
|   | HDW |

**NW - Number of words in entry block.**

**HL - Hash link - points to next entry with same hash code.**

**A - Activity bit.** 0 if active, 1 if inactive  
outer block.

C - Callability bit set if entry point is uncallable.

I - Priv mode bit - set if program unit is to be executed in priv mode.

**NC - Number of characters in name. Max is 15.**

**CHAR. 1 - First character in variable field.**

**CHAR. NC - Last character in variable field.**

L - Last entry in list.  
0 if not last  
1 if last

DIRECTORY ENTRY TYPE 2 (CONT.)

-----

SUBL - Subprogram link - points to next entry  
having the same segment name.

SECL - Secondary entry point list link.

SSA - Program unit starting PB address.

SAC - Starting FILE address of code  
module

F - Set if fatal error

W - Set if non-fatal error

NWC - Number of words in code module.

SE - Stack size estimate

TPDB - Total number of words of primary  
DB to be allocated

TSDB - Total number of words of secondary  
DB to be allocated.

NWPUST - Number of words in trace array  
(PUST)

NWD - Number of words in data array  
(FORTRAN)

NWSDB - Number of words in secondary  
DB array (SPL)

T - Terminating bit - set if last set of  
headers in entry

NH - Number of headers

SAH - Starting address of header (relative  
to SAI)

HDW - Header DESCRIPTOR (Word 0)

# DIRECTORY ENTRY TYPE 3

## OUTER BLOCK - SECONDARY ENTRY POINT

| 0                        | 1    | 2     | 3  | 4 | 5  | 6 | 7 | 8      | 10 | 11 | 15 |                      |  |
|--------------------------|------|-------|----|---|----|---|---|--------|----|----|----|----------------------|--|
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| //                       |      |       | NW |   |    |   |   |        | 3  |    |    |                      |  |
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| HL                       |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| A                        | C    | // // |    |   | NC |   |   | CHAR 1 |    |    |    |                      |  |
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| (VARIABLE # CHAR.SEE NC) |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| CHAR NC                  |      |       |    |   |    |   |   |        |    |    |    | //////////////////// |  |
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| L                        | SECL |       |    |   |    |   |   |        |    |    |    |                      |  |
| -----                    |      |       |    |   |    |   |   |        |    |    |    |                      |  |
| SSA                      |      |       |    |   |    |   |   |        |    |    |    |                      |  |

# DIRECTORY ENTRY TYPE 4

## PROCEDURE

| 0                         | 1    | 2 | 3 | 4                                    | 5 | 6      | 7 | 8 | 10 | 11 | 15 |
|---------------------------|------|---|---|--------------------------------------|---|--------|---|---|----|----|----|
| //                        |      |   |   | NW                                   |   |        |   | 4 |    |    |    |
| HL                        |      |   |   |                                      |   |        |   |   |    |    |    |
| A                         | C    | I | H | NC                                   |   | CHAR.1 |   |   |    |    |    |
| (VARIABLE # CHAR. SEE NC) |      |   |   |                                      |   |        |   |   |    |    |    |
| CHAR.NC                   |      |   |   | //////////////////////////////////// |   |        |   |   |    |    |    |
| L                         | SUBL |   |   |                                      |   |        |   |   |    |    |    |
| L                         | SECL |   |   |                                      |   |        |   |   |    |    |    |
| SSA                       |      |   |   |                                      |   |        |   |   |    |    |    |

DIRECTORY ENTRY TYPE 4 (CONT.)

|                               |    |                                      |
|-------------------------------|----|--------------------------------------|
| SAC                           |    |                                      |
| F                             | W  | NWC                                  |
| SE                            |    |                                      |
| TPDB                          |    |                                      |
| TSDB                          |    |                                      |
| NWPUST                        |    |                                      |
| NWD/NWO                       |    |                                      |
| P                             | NP | //////////////////////////////////// |
| TN                            |    |                                      |
| PARM.1                        |    |                                      |
| (VARIABLE # OF PARMS. SEE CN) |    |                                      |
| PARM. NP                      |    |                                      |
| T                             | NH |                                      |
| SAH                           |    |                                      |
| HDW                           |    |                                      |
| .                             |    |                                      |
| .                             |    |                                      |
| .                             |    |                                      |
| HDW                           |    |                                      |
| .                             |    |                                      |
| .                             |    |                                      |
| .                             |    |                                      |
| ETC                           |    |                                      |

#### DIRECTORY ENTRY TYPE 4 (CONT.)

-----

NW - Number of words in entry block  
HL - Hash link - points to next entry with same hash code  
A - Activity bit. 0 if active, 1 if inactive entry point  
C - Callability bit set if entry point is uncallable  
I - Priv mode bit. Set if procedure is to be executed in priv mode.  
H - Hidden entry point. Set if entry point will not be in library directory.  
NC - Number of characters in name. Max is 15.  
CHAR1 - First character in variable field.  
CHAR NC - Last character in variable field.  
L - Last entry in list  
    0 if not last  
    1 if last  
SUBL - Subprogram link. Points to next entry having the same segment Name  
SECL - Secondary entry point list link.  
SSA - Unit starting PB address  
SAC - Starting (file) address of code module  
F - Set if fatal error  
W - Set if non-fatal error  
NWC - Number of words in code module  
SE - Stack size estimate  
TPDB - Total number of words of primary DB to be allocated.  
TSDB - Total number of words of secondard DB to be allocated.  
NWPUST - Number of words in trace array (PUST)  
NWD - Number of words in data array (FORTRAN)  
NWO - Number of words in own array (SPL)  
P - Parm checker  
    00 no checking. (Implies NP undefined, TN and PARM's absent)  
    01 check procedure type. (Implies NP is undefined and PARM's absent)  
    10 check procedure type and number of PARM's (implies PARM's absent)  
    11 check procedure type, number of PARM 's and type of each PARM.  
NP - Number of PARM's  
TN - Procedure Type  
T - Terminating bit. Set if last set of headers in entry.  
NH - Number of headers  
SAH - Starting address of header  
HDW - Header Descriptor (Word 0)

# DIRECTORY ENTRY TYPE 5

## PROCEDURE - SECONDARY ENTRY POINT

| 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 15 |
|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|
| ----- ----- -----             |   |   |   |   |   |   |   |   |    |    |    |
| //  NW   5                    |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |
| HL                            |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |
| A   C   //   H   NC   CHAR. 1 |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |
| (VARIABLE #CHAR. SEE NC)      |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |
| CHAR. NC                      |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |
| L   SECL                      |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |
| SSA                           |   |   |   |   |   |   |   |   |    |    |    |
| -----                         |   |   |   |   |   |   |   |   |    |    |    |

NW - Number of words in entry block

HL - Hash link - points to next entry with same hash code

A - Activity bit. 0 if active, 1 if inactive entry point

C - Callability bit set if entry point is uncallable.

H - Hidden entry point set if entry point will not be in library directory

NC - number of characters in name, max is 15

CHAR 1 - First character in variable field.

CHAR NC - Last character in variable name.

L - Last entry in list  
0 if not last  
1 if last

SECL - Secondary entry point list link

SSA - Unit starting PB' address



# DIRECTORY ENTRY TYPE 6

## INTERRUPT PROCEDURE

|                      |                           |        |
|----------------------|---------------------------|--------|
| 0 1  2  3  4 5 6 7 8 | 10 11                     | 15     |
| ///                  | NW                        | 6      |
|                      | HL                        |        |
| A   IT               | ///  NC                   | CHAR.1 |
|                      | (VARIABLE # CHAR. SEE NC) |        |
|                      | CHAR. NC                  |        |
|                      | IPL                       |        |
|                      | DBS                       |        |
|                      | SSA                       |        |
|                      | SAC                       |        |
| F   W                | NWC                       |        |
| T                    | NH                        |        |
|                      | SAH                       |        |
|                      | HDW                       |        |
|                      | .                         |        |
|                      | HDW                       |        |

## DIRECTORY ENTRY TYPE 6 (CONT.)

-----

NW - Number of words in entry block

HL - Hash link. Points to next entry with same hash code

A - Activity bit. 0 if active, 1 if inactive entry.

IT - Interrupt procedure type number

NC - Number of characters in name (maximum is 15)

CHAR 1 - First character in variable field.

CHAR NC Last Character in variable field

IPL Interrupt procedure link

DBS Number of words of DB storage required.

SSA Unit starting PB' address

SAC Starting (file) address of code module.

F Set if fatal error

W Set if non-fatal error

NWC Number of words in code module

T Terminating bit. Set if last set of headers in entry.

NH Number of headers

SAH Starting address of header.

HDW Header Descriptor (Word 0)

# DIRECTORY ENTRY TYPE 7

## BLOCK DATA

|                      |    |   |     |                      |        |   |   |   |    |    |    |
|----------------------|----|---|-----|----------------------|--------|---|---|---|----|----|----|
| 0                    | 1  | 2 | 3   | 4                    | 5      | 6 | 7 | 8 | 10 | 11 | 15 |
| NW                   |    |   |     |                      |        |   |   | 7 |    |    |    |
| HL                   |    |   |     |                      |        |   |   |   |    |    |    |
| A                    | F  | W | /// | NC                   | CHAR.1 |   |   |   |    |    |    |
| BLOCK DATA NAME      |    |   |     |                      |        |   |   |   |    |    |    |
| CHAR.NC              |    |   |     | //////////////////// |        |   |   |   |    |    |    |
| BDL                  |    |   |     |                      |        |   |   |   |    |    |    |
| CAL                  |    |   |     |                      |        |   |   |   |    |    |    |
| //////////////////// |    |   |     | NC                   | CHAR.1 |   |   |   |    |    |    |
| COMMON ARRAY NAME    |    |   |     |                      |        |   |   |   |    |    |    |
| CHAR.NC              |    |   |     | //////////////////// |        |   |   |   |    |    |    |
| T                    | NH |   |     |                      |        |   |   |   |    |    |    |
| SAH                  |    |   |     |                      |        |   |   |   |    |    |    |
| HDW                  |    |   |     |                      |        |   |   |   |    |    |    |
| .                    |    |   |     |                      |        |   |   |   |    |    |    |
| HDW                  |    |   |     |                      |        |   |   |   |    |    |    |
| .                    |    |   |     |                      |        |   |   |   |    |    |    |

# DIRECTORY ENTRY TYPE 7 (CONT.)

|                   |             |
|-------------------|-------------|
| CAL               |             |
| //////////        | NC   CHAR.1 |
| COMMON ARRAY NAME |             |
| CHAR.NC           | //////////  |
| T                 | NH          |
| SAH               |             |
| HDW               |             |
| ETC               |             |

NW      Number of words in block

HL      Hash link. Points to next entry with same hash code.

A      Activity bit. 0 if active, 1 if inactive block.

F      Set if fatal error.

W      Set if non-fatal error.

NC      Number of characters in name (max is 15).

CHAR 1 First character in variable field.

CHAR NC Last character in variable field.

BDL      Block data link

CAL      Common array length

T      Terminating bit. Set if last set of headers in entry.

NH      Number of headers.

SAH     Starting address of headers.  
HDW     Header Descriptor (Word 0)

# DIRECTORY ENTRY TYPE 8

## PROCEDURE - SECONDARY ENTRY POINT

| 0                        | 1    | 2   | 3 | 4                    | 5  | 6 | 7       | 8 | 10 | 11 | 15 |
|--------------------------|------|-----|---|----------------------|----|---|---------|---|----|----|----|
| ///                      |      |     |   | NW                   |    |   |         | 8 |    |    |    |
| HL                       |      |     |   |                      |    |   |         |   |    |    |    |
| A                        | C    | /// |   | H                    | NC |   | CHAR. 1 |   |    |    |    |
| (VARIABLE #CHAR. SEE NC) |      |     |   |                      |    |   |         |   |    |    |    |
| CHAR. NC                 |      |     |   | //////////////////// |    |   |         |   |    |    |    |
| L                        | SECL |     |   |                      |    |   |         |   |    |    |    |
| SSA                      |      |     |   |                      |    |   |         |   |    |    |    |
| P                        | NP   |     |   | //////////////////// |    |   |         |   |    |    |    |
| TN                       |      |     |   |                      |    |   |         |   |    |    |    |
| PARM. 1                  |      |     |   |                      |    |   |         |   |    |    |    |
| .                        |      |     |   |                      |    |   |         |   |    |    |    |
| .                        |      |     |   |                      |    |   |         |   |    |    |    |
| .                        |      |     |   |                      |    |   |         |   |    |    |    |
| PARM. NP                 |      |     |   |                      |    |   |         |   |    |    |    |

NW - NUMBER OF WORDS IN ENTRY BLOCK

HL - HASH LINK - POINTS TO NEXT ENTRY  
WITH SAME HASH CODE

A - ACTIVITY BIT. 0 IF ACTIVE, 1 IF INACTIVE  
ENTRY

C - CALLABILITY BIT SET IF ENTRY POINT IS  
UNCALLABLE

H - HIDDEN ENTRY POINT. SET IF ENTRY  
POINT WILL NOT BE IN LIBRARY  
DIRECTORY

NC - NUMBER OF CHARACTERS IN NAME. MAX  
IS 15

DIRECTORY ENTRY TYPE 8 (CONT.)

-----  
CHAR 1 - FIRST CHARACTER IN VARIABLE LIST

CHAR NC - LAST CHARACTER IN VARIABLE  
LIST

L - LAST ENTRY IN LIST  
0 IF NOT LAST  
1 IF LAST

SECL - SECONDARY ENTRY POINT LIST LINK

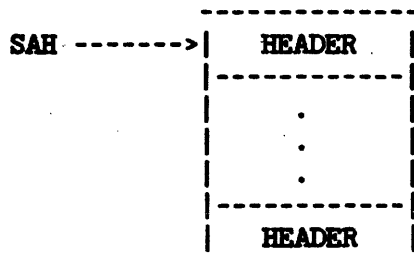
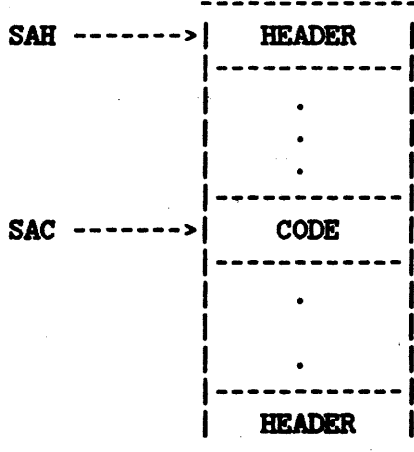
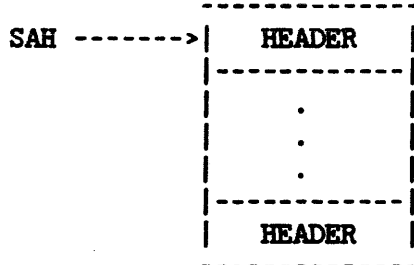
SSA - UNIT STARTING PB' ADDRESS

P - PARM CHECKER  
00 NO CHECKING (IMPLIES NP UNDEFINED,  
TN AND PARMS ABSENT)  
01 CHECK PROCEDURE TYPE (IMPLIES NP  
IS UNDEFINED AND PARMS ABSENT)  
10 CHECK PROCEDURE TYPE AND NUMBER  
OF PARMS. (IMPLIES PARMS ABSENT)  
11 CHECK PROCEDURE TYPE, NUMBER OF  
PARMS AND TYPE OF PARM.

NP - NUMBER OF PARMS

TN - PROCEDURE TYPE

# ENTRY HEADER FORMAT



EACH ENTRY (EXCEPT SECONDARY ENTRY POINT ENTRIES) MAY DESCRIBE N > 0 SETS OF HEADERS. THE HEADERS IN EACH SET MUST BE CONTINUOUS AND IN THE SAME ORDER AS THE HOW LIST DESCRIBING THE SET.

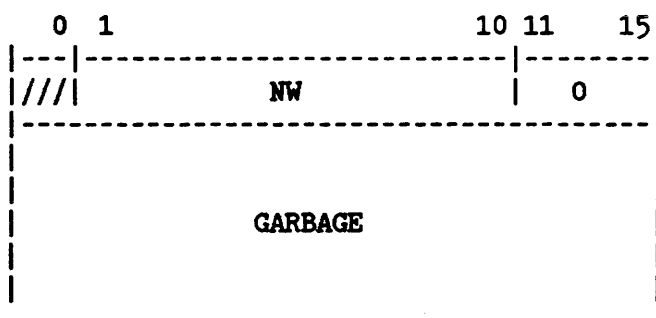
THE CODE MODULE MAY BE PLACED IN ANY POSITION IN A HEADER SET. NOTE THAT IF THE CODE MODULE IS AT THE BEGINNING OF A SET, SAC = SAH.

IF THE ENTRY HAS NO HEADER SET, THEN NH, SAH SEQUENCE IS ABSENT.



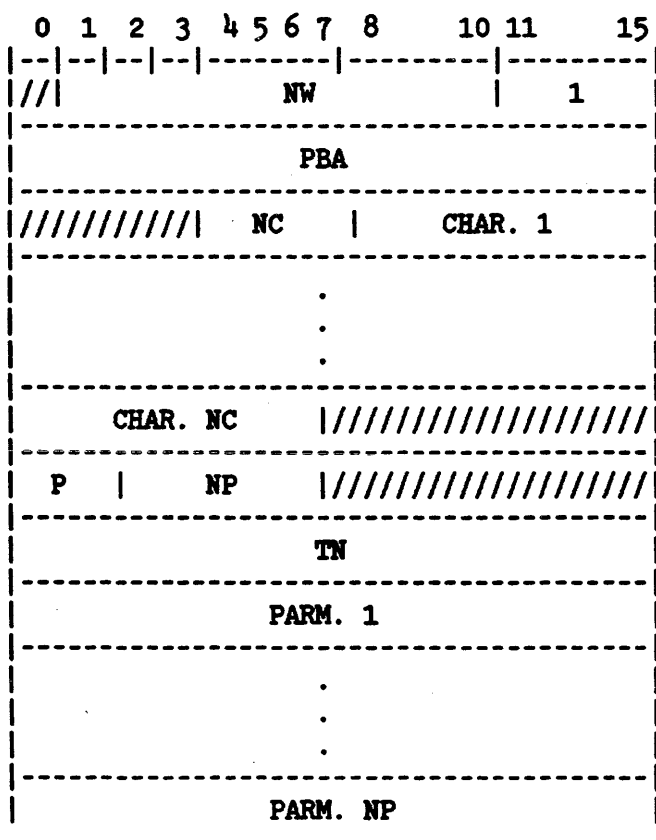
# HEADER TYPE 0

GARBAGE



PCALs and LLBL

## HEADER TYPE 1



PBA - PB' ADDRESS OF LINKED LIST OF PCAL or LLBL  
 INSTRUCTIONS TO BE REPAIRED - LOWER  
 14 BITS USED AS NEGATIVE DISP. - BIT 0  
 SET MEANS THAT WORD IS A LLBL  
 INSTRUCTION WITH A POINTER TO A SST  
 LABEL OF 'EXTERNAL' FORMAT - A  
 LINK OF 0 TERMINATES THE LIST - BIT 1  
 SET MEANS THAT THE WORD IS TO BE  
 INITIALIZED WITH THE PB ADDRESS OF  
 THE PROCEDURE.

# HEADER TYPE 2

-----

## PB ADDRESSES

| 0     | 1   | 10  | 11  | 15  |
|-------|-----|-----|-----|-----|
| ---   | --- | --- | --- | --- |
| ///   | NW  |     |     | 2   |
| ----- |     |     |     |     |
| PBA   |     |     |     |     |
| ----- |     |     |     |     |
| .     |     |     |     |     |
| .     |     |     |     |     |
| .     |     |     |     |     |
| ----- |     |     |     |     |
| PBA   |     |     |     |     |
| ----- |     |     |     |     |

PBA - PB' ADDRESS OF PB ADDRESS  
TO BE CORRECTED

# HEADER TYPE 3

-----

## OWN/DATA VARIABLES

| 0     | 1   | 10  | 11  | 15  |
|-------|-----|-----|-----|-----|
| ---   | --- | --- | --- | --- |
| ///   | NW  |     |     | 3   |
| ----- |     |     |     |     |
| B     | PBA |     |     |     |
| ----- |     |     |     |     |
| .     |     |     |     |     |
| .     |     |     |     |     |
| .     |     |     |     |     |
| ----- |     |     |     |     |
| B     | PBA |     |     |     |
| ----- |     |     |     |     |

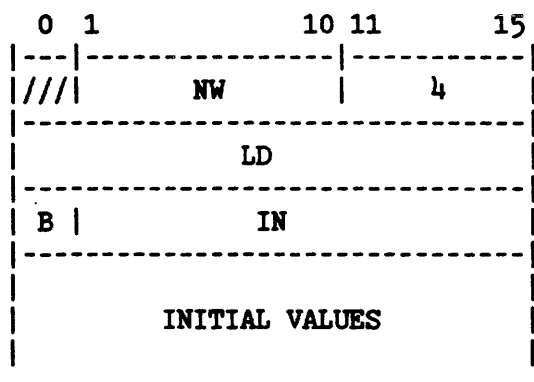
PBA - PB' WORD ADDRESS OF OWN VARIABLE  
POINTER TO BE CORRECTED

B - is set =1 to mean that (PBA) is a  
BYTE OFFSET.

(PBA) - Secondary DB-relative OFFSET.

# HEADER TYPE 4

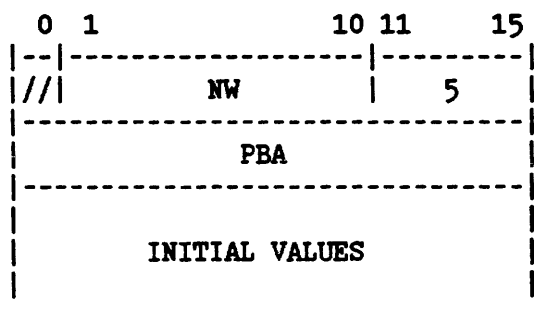
SDB/OWN/DATA/VALUES



- LD - LOGICAL WORD DISPLACEMENT  
IN OWN ARRAY FOR INITIAL VALUES
- B - BYTE BIT-SET IMPLIES THAT LD IS A  
BYTE OFFSET AND THAT THE FIRST  
WORD OF THE INITIAL VALUE BLOCK  
IS A COUNT OF THE NUMBER OF BYTES  
IN THE INITIAL VALUE BLOCK
- IN - INTERATION NUMBER - NUMBER OF  
TIMES THE BLOCK OF INITIAL VALUE  
IS TO APPEAR IN THE SECONDARY DB -  
1->NO DUPLICATION,  
2->DUPLICATION, ETC

# HEADER TYPE 5

PUST



- PBA - PB' ADDRESS OF LINKED LIST OF  
POINTERS TO BE INITIALIZED WITH  
DB ADDRESS OF PUST (SAME LIST  
FORMAT AS FOR FORMAT STRINGS)  
A PBA of -1 INDICATES NO FIX-UPS.

NOTE: ALL REFERENCES TO THE PUST INCLUDE THE FOUR-WORD HEADER  
THAT IS APPENDED BY THE SEGMENTER. THESE WORDS ARE NOT  
PRESENT IN THE HEADER; THEY ARE AUTOMATICALLY  
ALLOCATED AND INITIALIZED BY THE SEGMENTER.

1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007

|          |   |     |     |     |     |     |     |         |     |     |     |    |
|----------|---|-----|-----|-----|-----|-----|-----|---------|-----|-----|-----|----|
| 0        | 1 |     |     | 7   | 8   |     |     | 10      | 11  |     | 15  |    |
|          | - | - - | - - | - - | - - | - - | - - | - -     | - - | - - | - - |    |
|          | / | /   |     | NW  |     |     |     |         |     | 6   |     |    |
| -----    |   |     |     |     |     |     |     |         |     |     |     |    |
| TN       |   |     |     |     |     |     |     |         |     |     |     |    |
| -----    |   |     |     |     |     |     |     |         |     |     |     |    |
| DBA      |   |     |     |     |     |     |     |         |     |     |     | NC |
| -----    |   |     |     |     |     |     |     |         |     |     |     |    |
| CHAR. 1  |   |     |     |     |     |     |     | CHAR. 2 |     |     |     |    |
| -----    |   |     |     |     |     |     |     |         |     |     |     |    |
|          |   |     |     |     |     |     |     |         |     |     |     |    |
|          |   |     |     |     |     |     |     |         |     |     |     |    |
|          |   |     |     |     |     |     |     |         |     |     |     |    |
| -----    |   |     |     |     |     |     |     |         |     |     |     |    |
| CHAR. NC |   |     |     |     |     |     |     |         |     |     |     |    |

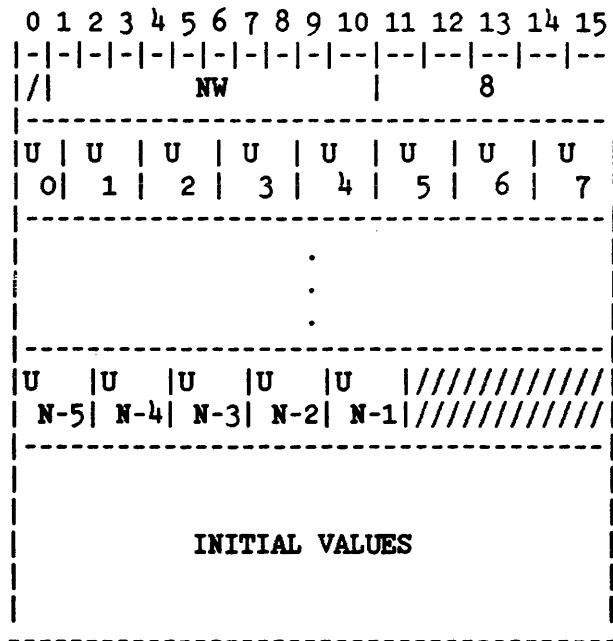
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

|          | 0 | 1 | 2 | 3 | 4 | 5 | 6  | 7 | 8 |                      | 10    | 11   | 15 |
|----------|---|---|---|---|---|---|----|---|---|----------------------|-------|------|----|
| --       |   |   |   |   |   |   |    |   |   | ----                 |       | ---- |    |
|          | / | / |   |   |   |   | NW |   |   |                      |       |      | 7  |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| TN       |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| M        | / | / | / | / | / |   | NC |   |   |                      | CHAR. | 1    |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| .        |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| .        |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| .        |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| CHAR. NC |   |   |   |   |   |   |    |   |   | //////////////////// |       |      |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| DA       |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| PBA      |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| .        |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| .        |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| .        |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| -----    |   |   |   |   |   |   |    |   |   |                      |       |      |    |
| PBA      |   |   |   |   |   |   |    |   |   |                      |       |      |    |

**NOTE: PBA of -1 implies null list**

# HEADER TYPE 8

## PRIMARY DB



U - ADDRESS BITS  
 00 IF NO ADDRESS  
 01 IF NO ADDRESS  
 10 IF WORD ADDRESS IN SECONDARY DB  
 11 IF BYTE ADDRESS IN SECONDARY DB

N - NWPDB

NOTE: INITIAL ADDRESSES THAT ARE  
 SECONDARY DB ADDRESSES ARE 0  
 RELATIVE (I.E., THEY ARE  
 LOGICAL DISPLACEMENTS IN  
 SECONDARY DB).

# HEADER TYPE 9

## COMMON VARIABLES

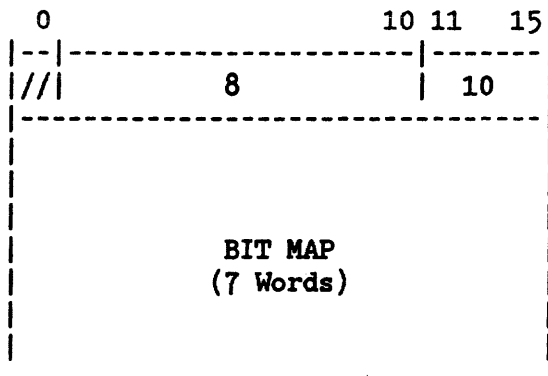
|                        |   |   |   |   |   |   |   |   |    |    |    |
|------------------------|---|---|---|---|---|---|---|---|----|----|----|
| 0                      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 15 |
| -                      | - | - | - | - | - | - | - | - | -  | -  | -  |
| ///                    |   |   |   |   |   |   |   |   | NW |    | 9  |
| NWC                    |   |   |   |   |   |   |   |   |    |    |    |
| ///////// NC   CHAR. 1 |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| CHAR. NC  /////////    |   |   |   |   |   |   |   |   |    |    |    |
| B  M  NL               |   |   |   |   |   |   |   |   |    |    |    |
| LD                     |   |   |   |   |   |   |   |   |    |    |    |
| DA                     |   |   |   |   |   |   |   |   |    |    |    |
| PBA                    |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| PBA                    |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| B  M  NL               |   |   |   |   |   |   |   |   |    |    |    |
| LD                     |   |   |   |   |   |   |   |   |    |    |    |
| DA                     |   |   |   |   |   |   |   |   |    |    |    |
| PBA                    |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| .                      |   |   |   |   |   |   |   |   |    |    |    |
| PBA                    |   |   |   |   |   |   |   |   |    |    |    |

HEADER TYPE 9 (CONT.)

- 
- NWC - NUMBER OF WORDS IN COMMON ARRAY
- NC - NUMBER OF CHARACTERS IN COMMON  
NAME- IF BLANK COMMON 4 COM'
- DA - LOGICAL WORD DISP. IN PUST - LOWER  
8 BITS OF WORD WILL BE INIT. WITH  
PRIM. DB ADDRESS OF VARIABLE - NOTE  
DA IS PRESENT only if M = 1
- B - BYTE BIT  
0 IF THE PRIMARY DB POINTER TO BE  
ALLOCATED AND INITIALIZED AND LD  
ARE OF TYPE WORD  
1 IF TYPE BYTE
- M - MONITORED VARIABLE BIT - SET IF  
VARIABLE IS BEING MONITORED BY  
DEBUG
- NL - NUMBER OF ADDRESS LISTS FOR  
VARIABLE
- LD - LOGICAL DISPLACEMENT OF VARIABLE  
IN COMMON ARRAY
- PBA - PB' ADDRESS OF LINKED LISTS OF  
INSTRUCTIONS TO BE REPAIRED  
LOWER 8 BITS USED AS NEGATIVE  
DISPLACEMENT TO NEXT INSTRUCTION  
A LINK OF 0 TERMINATES THE  
LIST
- PBA = -1 INDICATES NO FIX-UPS

# HEADER TYPE 10

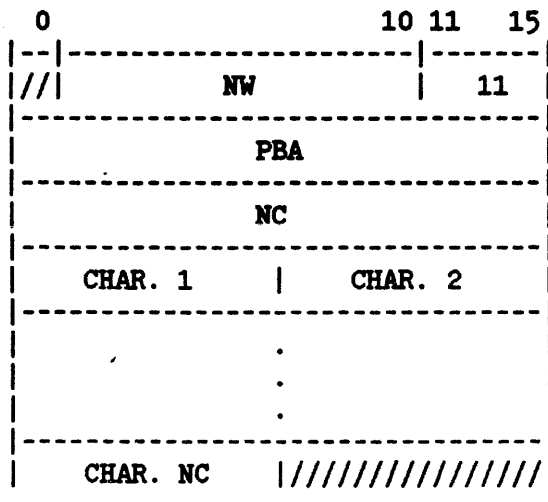
## LOGICAL UNITS



BIT MAP - BIT MAP OF LOGICAL UNITS  
 REFERENCED; BIT 0  
 CORRESPONDS TO LU 0, ETC.  
 (1 LESS THAN OR EQUAL TO LU  
 LESS THAN OR EQUAL TO 99)  
 1 <= LU <= 99

# HEADER TYPE 11

## FORMAT STRING



PBA - PB' ADDRESS OF LINKED LIST OF  
 POINTERS TO BE INITIALIZED--  
 LOWER 14 BITS OF WORD USED  
 AS NEGATIVE DISPLACEMENT TO  
 NEXT POINTER - BIT 0 SET  
 MEANS THAT THE POINTER IS TO  
 BE TYPE BYTE - A LINK OF 0  
 TERMINATES THE LIST.



.....

**NOTE: UNINITIALIZED FIELDS ARE  
RESERVED FOR FUTURE USE AND  
SHOULD BE ZERO.**

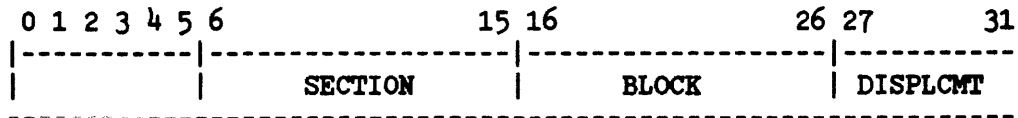
## STORAGE MANAGEMENT

FILE SPACE IS MANAGED IN TERMS OF 32 WORD BLOCKS (4 BLOCKS PER 128 WORD RECORD).

FREE SPACE (BLOCKS) IS ACCOUNTED FOR IN A BIT MAP, WHICH IS PARTITIONED INTO RECORDS (2K BLOCKS PER SECTION). A 0 INDICATES THAT A BLOCK IS USED, A 1 INDICATES THAT IT IS FREE.

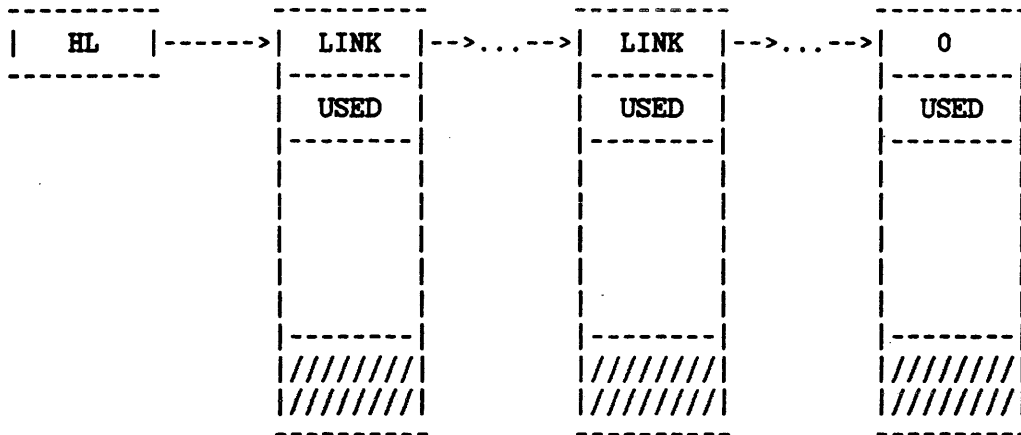
FILE SPACE IS ALSO PARTITIONED INTO 512 RECORD SECTIONS (64 MAX. SECTIONS, 2K BLOCKS PER SECTION, 1 MAP PER SECTION). THE NUMBER OF SECTIONS IN A FILE IS  $NS = (FL + 511) \& LSR(9)$ . THE FIRST NS RECORDS FOLLOWING RECORD 0 (RECORDS 1 TO NS) ARE RESERVED FOR THE SECTION MAPS.

A COMPLETE FILE ADDRESS WOULD HAVE THE FOLLOWING CONFIGURATION:



FILE (WORD) ADDRESS  
DOUBLE WORD

# ENTRY POINT DIRECTORY



THE DIRECTORY IS PARTITIONED INTO 95 HASH LISTS (SAME HASH FUNCTION AS USL); EACH HASH LIST IS A LINKED LIST OF RECORDS.

EACH RECORD CONTAINS A SUCCESSOR LINK (RECORD #) AND A USED SPACE COUNT. A LINK OF 0 TERMINATES A LIST. WHEN A RECORD IS VOID OF ENTRIES (USED=2), ITS SPACE IS RETURNED TO THE FREE STORAGE AREA.

[illegible]

|                 |   |         |     |                      |         |
|-----------------|---|---------|-----|----------------------|---------|
| S               | U | I       | /// | NC                   | CHAR. 1 |
| -----           |   |         |     |                      |         |
| .               |   |         |     |                      |         |
| .               |   |         |     |                      |         |
| -----           |   |         |     |                      |         |
| CHAR. NC        |   |         |     | //////////////////// |         |
| -----           |   |         |     |                      |         |
| S.A. INFO BLOCK |   |         |     |                      |         |
| -----           |   |         |     |                      |         |
| S.A. ENTRY      |   |         |     |                      |         |
| -----           |   |         |     |                      |         |
| F               | W | NW CODE |     |                      |         |
| -----           |   |         |     |                      |         |
| LC              |   | NP      |     | CN                   |         |
| -----           |   |         |     |                      |         |
| TN              |   |         |     |                      |         |
| -----           |   |         |     |                      |         |
| PARAM. 1.       |   |         |     |                      |         |
| -----           |   |         |     |                      |         |
| .               |   |         |     |                      |         |
| .               |   |         |     |                      |         |
| .               |   |         |     |                      |         |
| -----           |   |         |     |                      |         |
| PARAM. NP       |   |         |     |                      |         |

```

LC is (0:2)...Level of Checking
 0 = No checking
 1 >= Check for procedure type
 2 >= Check for # parameters
 3 >= Check for parameter type
NP is (2:6) is # parameters

```

# PROCEDURE INFO BLOCK

| 0              | 15  |     |
|----------------|-----|-----|
| NW INFO        |     |     |
| NW CODE        |     |     |
| # ENTRY POINTS |     |     |
| CODE MODULE    | NWC |     |
| EXTN LINK      |     |     |
| TPDB           |     |     |
| TSDB           |     |     |
| NWSDB          |     | NWI |
| HEADER         |     |     |
| HEADER         |     |     |
| .              |     |     |
| .              |     |     |
| HEADER         |     |     |
| -1             |     |     |

ALL HEADERS FOR THE PROCEDURE ARE APPENDED TO THE INFO BLOCK. THE  
 HEADER SETS (EXTERNAL LISTS) ARE LINKED BY INCREASING FILE  
 ADDRESS; A LINK OF %1777777777D TERMINATES THE LIST.

# HEADERS

| 0               | 1 | 2 | 3   | 4        | 5 | 6 | 7 | 8                                | 9 | 10 | 11 | 12 | 13 | 14      | 15 |
|-----------------|---|---|-----|----------|---|---|---|----------------------------------|---|----|----|----|----|---------|----|
| ///             |   |   |     | NW       |   |   |   |                                  |   |    |    |    |    | 1       |    |
| F               | W |   |     |          |   |   |   | NW CODE                          |   |    |    |    |    |         |    |
| S.A. INFO BLOCK |   |   |     |          |   |   |   |                                  |   |    |    |    |    |         |    |
| S.A. ENTRY      |   |   |     |          |   |   |   |                                  |   |    |    |    |    |         |    |
| PBA             |   |   |     |          |   |   |   |                                  |   |    |    |    |    |         |    |
| S               | U | I | /// | NC       |   |   |   |                                  |   |    |    |    |    | CHAR. 1 |    |
|                 |   |   |     |          |   |   |   | .                                |   |    |    |    |    |         |    |
|                 |   |   |     |          |   |   |   | .                                |   |    |    |    |    |         |    |
|                 |   |   |     |          |   |   |   | .                                |   |    |    |    |    |         |    |
|                 |   |   |     | CHAR. NC |   |   |   | //////////////////////////////// |   |    |    |    |    |         |    |
| P               |   |   |     | NP       |   |   |   |                                  |   |    |    |    |    | CN      |    |
| TN              |   |   |     |          |   |   |   |                                  |   |    |    |    |    |         |    |
| PARM. 1         |   |   |     |          |   |   |   |                                  |   |    |    |    |    |         |    |
|                 |   |   |     |          |   |   |   | .                                |   |    |    |    |    |         |    |
|                 |   |   |     |          |   |   |   | .                                |   |    |    |    |    |         |    |
|                 |   |   |     |          |   |   |   | .                                |   |    |    |    |    |         |    |
| PARM. NP        |   |   |     |          |   |   |   |                                  |   |    |    |    |    |         |    |

F - SET IF FATAL ERROR  
 W - SET IF NON-FATAL ERROR  
 S - SATISFIED BIT - SET IF EXTERNAL IS SATISFIED WITHIN RL.  
 U - UNCALLABLE BIT  
 I - PRIVILEGED BIT

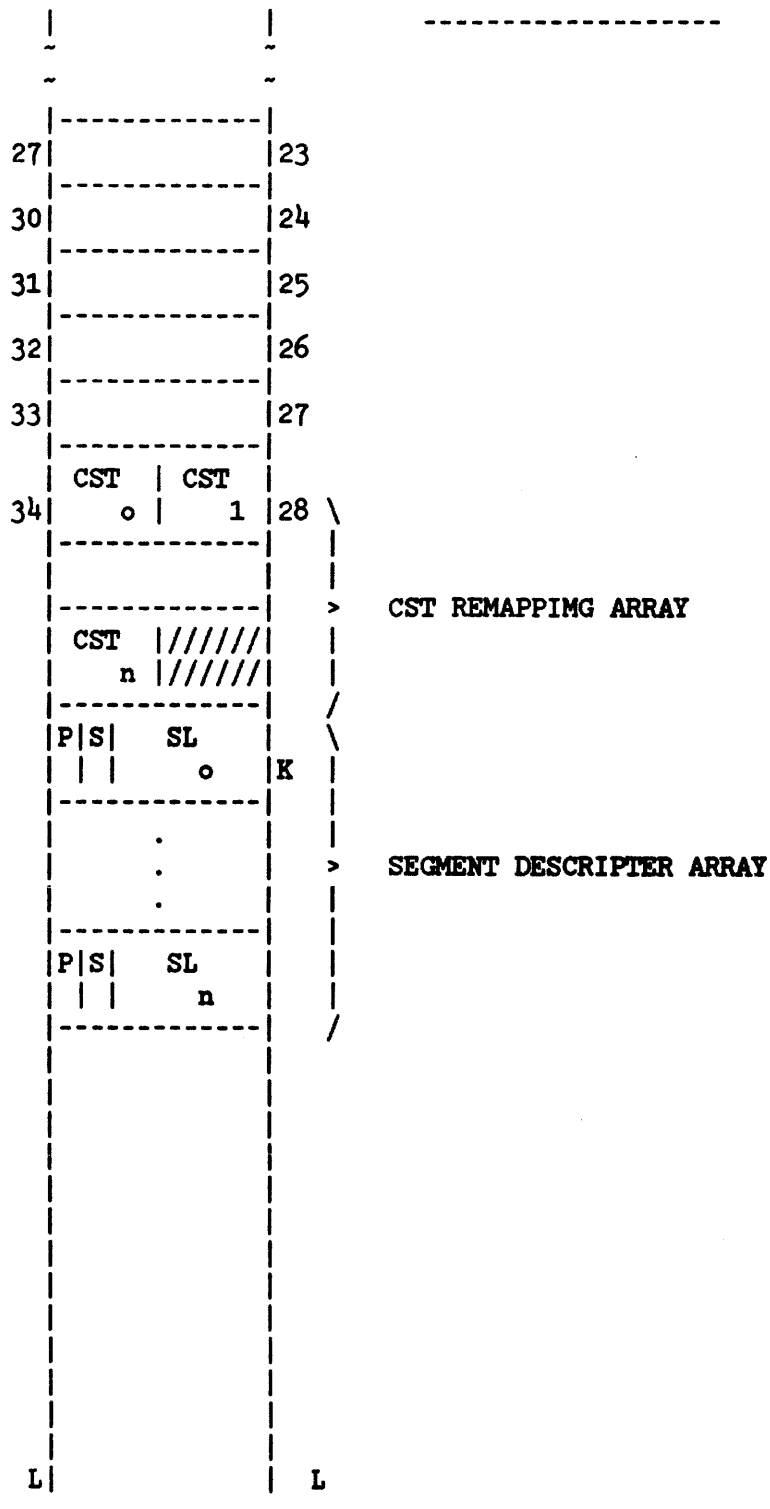
ALL HEADERS ARE THE SAME AS IN A USL EXCEPT FOR THE PCAL HEADER.

# CHAPTER 10    PREPARED OBJECT CODE

## PROGRAM FILE FORMAT

|    |        |    |                                                                                  |
|----|--------|----|----------------------------------------------------------------------------------|
| 0  | FLAGS  | 0  |                                                                                  |
| 1  | NS     | 1  | NUMBER OF CODE SEGMENTS                                                          |
| 2  | GS     | 2  | GLOBAL SIZE (DB TO QI) IN WORDS                                                  |
| 3  | SAG    | 3  | GLOBAL AREA RECORD #                                                             |
| 4  | SAS    |    | SEGMENT SET RECORD # (EACH SEG. STARTS IN NEW RECORD)                            |
| 5  | ISS    | 5  | INITIAL STACK SIZE IN WORDS                                                      |
| 6  | IDLs   | 6  | INITIAL DL SIZE IN WORDS                                                         |
| 7  | MAXD   | 7  | MAX. DATA SEGMENT SIZE (DL TO Z) IN WORDS                                        |
| 10 | SAE    | 8  | ENTRY POINT LIST RECORD #                                                        |
| 11 | SSEG   | 9  | STARTING SEGMENT #                                                               |
| 12 | SADR   | 10 | PRIN. ENTRY PT PB ADDRESS                                                        |
| 13 | SASTLT | 11 | DB ADR. OF STLT (-1 IF NO STLT)<br>(STLT=Segment Length Table)                   |
| 14 | SAFLUT | 12 | DB ADR. OF FLUT (-1 IF NO FLUT)                                                  |
| 15 | SAX    | 13 | EXTERNAL LIST RECORD #                                                           |
| 16 | SSTT   | 14 | PRIN. ENTRY PT SST #                                                             |
| 17 | SATC   | 15 | STARTING ADDRESS OF TRAPCOM'                                                     |
| 20 |        | 16 | NOTE: UNINITIALIZED FIELDS ARE<br>RESERVED FOR FUTURE USE AND<br>SHOULD BE ZERO. |
| 21 |        | 17 |                                                                                  |
| 22 |        | 19 |                                                                                  |
| 23 |        | 19 |                                                                                  |
| 24 |        | 20 |                                                                                  |
| 25 |        | 21 |                                                                                  |
| 26 |        | 22 |                                                                                  |

PROGRAM FILE FORMAT (CONT.)



P-PRIVILEGED MODE

S-Segment STT format: 0=> old format, 1=> new (extended) format

N=NS -1

K=28 + (NS +1) & LSR (1)

L=((28 + NS + (NS + 1)&LSR(1) + 127)/128)128 - 1



# FLAGS

-----

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  | 10 | 11 | 12 | 13 | 14  | 15     |
|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-----|--------|
|   |   |   |   |   |   |   |   |    |    |    |    |    |    |     |        |
| F | W | Z | P |   |   |   |   | BA | IA | PM |    |    | MR | /// | DS  PH |

-----

F - FATAL ERROR IN PROGRAM  
W - NON-FATAL ERROR IN PROGRAM  
Z - ZERO UNIT DL AREA  
P - SET IF ANY SEG IS PRIV. (IF NOT SET NORMAL=NONPRIV MODE)

## CAPABILITIES

|                                   |   |                        |      |
|-----------------------------------|---|------------------------|------|
| ACCESS TO<br>GENERAL<br>RESOURCES | / | BATCH ACCESS (9)       | [BA] |
|                                   |   | INTERACTIVE ACCESS (8) | [IA] |
|                                   |   | PRIVILEGED MODE (7)    | [PM] |
|                                   |   | <                      |      |
|                                   |   | MULTIPLE RINS (4)      | [MR] |
|                                   |   | EXTRA DATA SEGMENT (2) | [DS] |
|                                   | \ | PROCESS HANDLING (1)   | [PH] |

#### CST REMAPPING ARRAY

-----

CONTAINS THE LAST CST NUMBERS ASSIGNED TO THE SEGMENTS;  
INDEXED BY SEGMENT NUMBER. WHEN A PROGRAM FILE IS  
PREPARED, THE ARRAY IS INITIALIZED TO 0, 1...,N.  
THIS ARRAY IS USED TO RE-ESTABLISH INTRA-PROGRAM  
LINKAGE WHEN THE PROGRAM IS LOADED.

#### SEGMENT DESCRIPTER ARRAY

-----

CONTAINS THE SEGMENT LENGTH AND A FLAG INDICATING IF THE  
SEGMENT IS TO BE LOADED IN PRIV. MODE. INDEXED BY  
SEGMENT NUMBER. ALL SEGMENTS BEGIN ON A RECORD BOUNDARY.  
THE NUMBER OF RECORDS FOR A GIVEN SEGMENT IS  $(SL + 127)$   
&  $LSR(7)$ . THE RECORD NUMBER, SAS, OF SEGMENT N IS

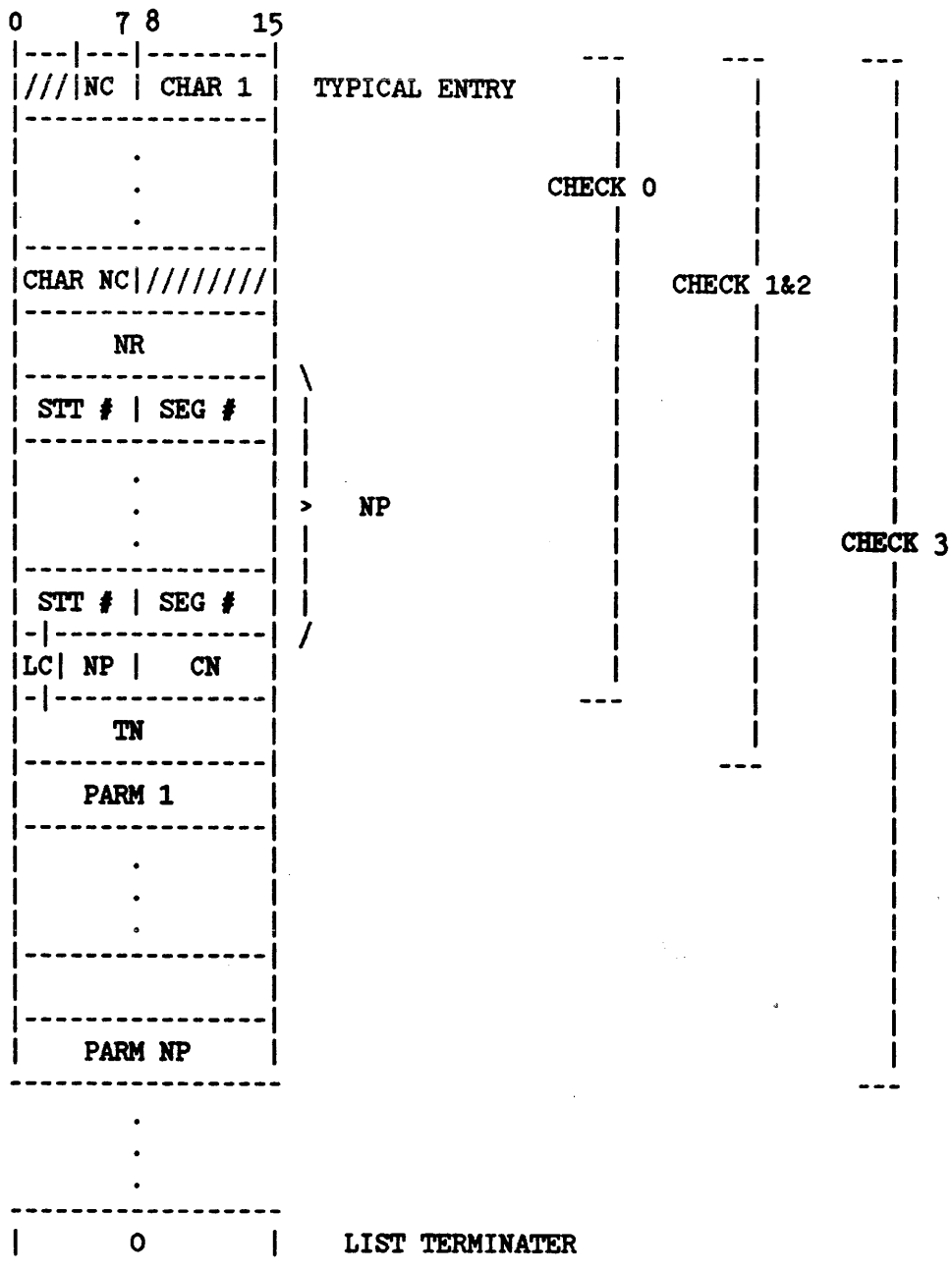
```
SAS:=0
FOR I=0 TO N-1
 BEGIN
 SAS:=SAS + $(SL(I) + 127) \& LSR(7)$
 END
```

#### GLOBAL AREA FORMAT

-----

A SET OF RECORDS CONTAINING THE INITIAL VALUES FOR THE  
GLOBAL AREA OF THE DATA SEGMENT. THIS SET BEGINS AT  
RECORD SAG (WORD 3) AND CONSISTS OF  $(GS + 127) \& LSR(7)$   
RECORDS.

# EXTERNAL LIST



LC (0:2) = LEVEL OF CHECKING

- 0 = NO CHECKING
- 1 >= CHECK FOR PROCEDURE TYPE
- 2 >= CHECK FOR # PARAMETERS
- 3 >= CHECK FOR PARAMETER TYPE

NP (2:6) IS # PARAMETERS

# ENTRY POINT LIST

|                    |
|--------------------|
| ////  NC   CHAR 1  |
| .                  |
| .                  |
| .                  |
| CHAR NC  ///////// |
| P.B. ADR           |
| STT #              |

.

|                    |
|--------------------|
| ////  NC   CHAR 1  |
| .                  |
| .                  |
| .                  |
| CHAR NC  ///////// |
| P.B. ADR           |
| STT #              |
| 0                  |

LIST TERMINATER

NOTE THAT THE ENTRY POINT LIST MUST IMMEDIATELY FOLLOW THE EXTERNAL LIST.

# SL FILE FORMAT

RECORD 0

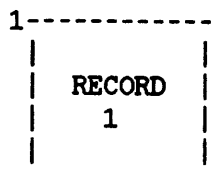
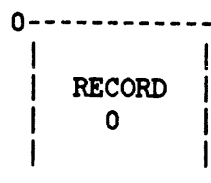
|     |      |                                             |
|-----|------|---------------------------------------------|
| 0   | LID  | 0                                           |
| 1   | FL   | 1 FILE LENGTH (IN RECORDS)                  |
| 2   | EL   | 2 EXTENT LENGTH (IN RECORDS)                |
| 3   |      | 3                                           |
| 4   | NSEG | 4 # SEGMENTS                                |
| 5   |      | 5                                           |
| 6   |      | 6                                           |
| 7   | FRTL | 7 S.A. OF FREE R.T. ENTRY LIST (-1 IF NONE) |
| 10  |      | 8                                           |
| 11  | NRT  | 9 # REFERENCE TABLE ENTRIES                 |
| 12  |      | 10                                          |
| 13  | NS   | 11 # SECTIONS                               |
| 14  |      | 12                                          |
| 41  | HL0  | 33                                          |
|     | .    |                                             |
|     | .    |                                             |
|     | .    |                                             |
| 177 | HL94 | 127                                         |

## NOTE:

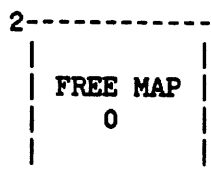
SHADED AND UNINITIALIZED FIELDS ARE  
RESERVED FOR FUTURE USE AND  
SHOULD BE ZERO. HL = HASH LIST.

# SL FILE FORMAT (CONT.)

-----

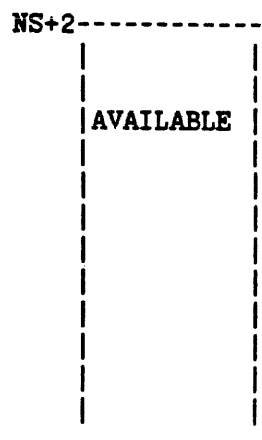
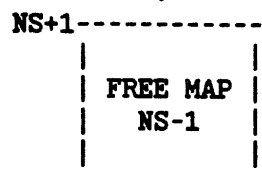


<--- REFERENCE TABLE POINTERS  
For entire SL file.



<--- There is one free map  
record for each section.

⋮



## STORAGE MANAGEMENT

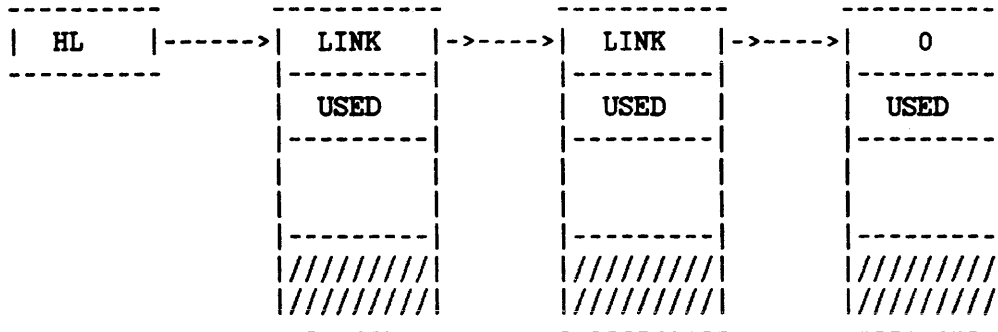
FILE SPACE IS MANAGED IN TERMS OF 128 WORD BLOCKS (1 BLOCK PER 128 WORD RECORD).

FREE SPACE (BLOCKS) IS ACCOUNTED FOR IN A BIT MAP, WHICH IS PARTITIONED INTO RECORDS (2K BLOCKS PER SECTION). A 0 INDICATES THAT A BLOCK IS USED; A 1 INDICATES THAT IT IS FREE.

FILE SPACE IS ALSO PARTITIONED INTO 2048 RECORD SECTIONS (16 MAX. SECTIONS, 2K BLOCKS PER SECTION, 1 MAP PER SECTION). THE NUMBER OF SECTIONS IN A FILE IS  $NS = (FL + 2047) \& LSR(11)$ . THE FIRST NS RECORDS FOLLOWING RECORDS 0, 1 (RECORDS 2 TO NS+1) ARE RESERVED FOR THE SECTION FREE MAPS.

IF THE SECTION MAPS SPECIFY MORE SPACE THAN IS POTENTIALLY AVAILABLE, THOSE RECORDS BEYOND FLIMIT ARE MARKED AS "USED".

### ENTRY POINT DIRECTORY



# TYPICAL DIRECTORY ENTRY

| 0                 | 1 | 2 | 3 | 4  | 5  | 6 | 7 | 8 | 9                                    | 10                                   | 11 | 12 | 13 | 14 | 15 |
|-------------------|---|---|---|----|----|---|---|---|--------------------------------------|--------------------------------------|----|----|----|----|----|
| ///   U   ///   P |   |   |   | NC |    |   |   |   | CHAR 1                               |                                      |    |    |    |    |    |
|                   |   |   |   |    |    |   |   | . |                                      |                                      |    |    |    |    |    |
|                   |   |   |   |    |    |   |   | . |                                      |                                      |    |    |    |    |    |
|                   |   |   |   |    |    |   |   | . |                                      |                                      |    |    |    |    |    |
| CHAR NC           |   |   |   |    |    |   |   |   | //////////////////////////////////// |                                      |    |    |    |    |    |
| STT.#             |   |   |   |    |    |   |   |   | SEG #                                |                                      |    |    |    |    |    |
| LC                |   |   |   |    | NP |   |   |   |                                      | //////////////////////////////////// |    |    |    |    |    |
| TN                |   |   |   |    |    |   |   |   |                                      |                                      |    |    |    |    |    |
| PARM 1            |   |   |   |    |    |   |   |   |                                      |                                      |    |    |    |    |    |
|                   |   |   |   |    |    |   |   | . |                                      |                                      |    |    |    |    |    |
|                   |   |   |   |    |    |   |   | . |                                      |                                      |    |    |    |    |    |
|                   |   |   |   |    |    |   |   | . |                                      |                                      |    |    |    |    |    |
| PARM NP           |   |   |   |    |    |   |   |   |                                      |                                      |    |    |    |    |    |

LC is (0:2)...Level of Checking

0 = No checking

1 >= Check for procedure type

2 >= Check for # parameters

3 >= Check for parameter type

NP is (2:6) is # parameters

P - 0= Not permanently allocated

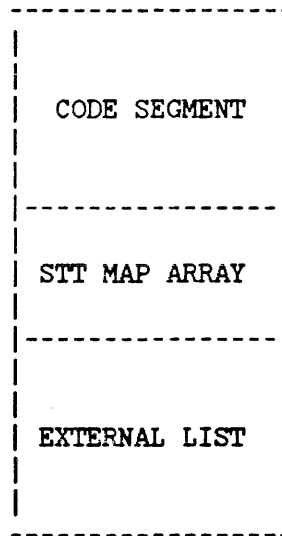
1= Permanently allocated

U - Uncallable bit - set if entry point is uncallable.



## CODE SEGMENT LINKAGE STRUCTURE

---



EACH CODE SEGMENT OCCUPIES AN INTEGRAL NUMBER OF RECORDS. THIS BLOCK OF INFORMATION CAN BE SUB-DIVIDED INTO THREE TABLES: THE CODE SEGMENT PROPER, AN STT SEGMENT MAP ARRAY, AND AN EXTERNAL LIST.

### STT MAP ARRAY

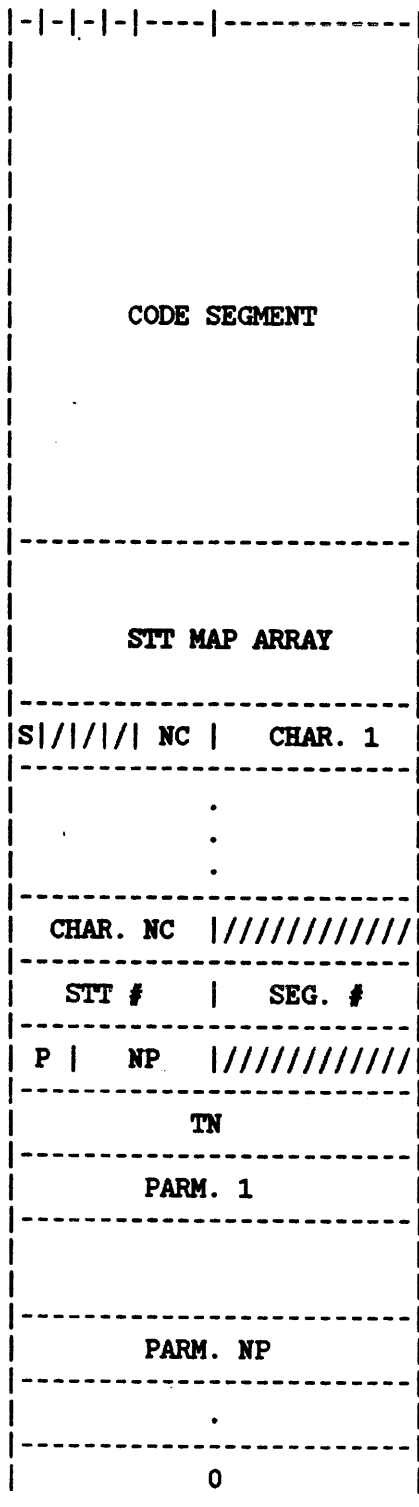
A 1 BYTE X 256 BYTE ARRAY. IT IS INDEXED BY STT NUMBER AND RETURNS (IF THE STT CORRESPONDS TO AN EXTERNAL OF THE SEGMENT) THE SEGMENT NUMBER OF THE EXTERNAL AND 255 OTHERWISE. THIS ARRAY IS USED WHENEVER THE SEGMENT IS LOADED AND IS UPDATED WHENEVER THE SL IS BOUND BY THE SEGMENTER.

### EXTERNAL LIST

A SYMBOLIC LIST OF THE EXTERNALS OF THE SEGMENT. EACH ENTRY CONTAINS INFORMATION ABOUT THE EXTERNAL: PARAMETER CHECKING LEVEL AND PARAMETER MATCHING INFORMATION, AND THE SEGMENT NUMBER AND STT NUMBER IF THE EXTERNAL IS SATISFIED WITHIN THE SL.

# CODE SEGMENT STRUCTURE (CONT.)

0 1 2 3 4 5 6 7 8 15



S - SATISFIED BIT - SET IF EXTERNAL  
IS SATISFIED WITHIN SL

EXTERNAL LIST TERMINATOR

## REFERENCE TABLE STRUCTURE

-----

FOR EACH SEGMENT THERE IS A REFERENCE TABLE ENTRY OF 32 WORDS. THE REFERENCE TABLE ENTRIES ARE PACKED FOUR TO A RECORD. THE RECORDS CONTAINING THE REFERENCE TABLE ENTRIES ARE LISTED IN RECORD 1. THE RECORD CONTAINING REFERENCE TABLE ENTRY N IS REC 1 (N.(0 : 14)); THE FIRST WORD OF THE ENTRY IS REFTAB (N.(14 : 2) & LSL (5)).

WHEN A SEGMENT IS DELETED, THE REFERENCE TABLE ENTRY CORRESPONDING TO THE SEGMENT IS RELEASED. THESE FREE ENTRIES ARE LINKED TOGETHER IN A LIST; THE SEGMENT # IS USED AS A LINK AND IS PLACED IN THE FIRST WORD OF THE ENTRY; -1 TERMINATES THIS LIST --- THE LIST HEAD IS RECORD 0 (7), FRTL.

WHEN A SEGMENT IS ADDED IT IS ASSIGNED A SEGMENT NUMBER (0 LESS THAN/EQUAL TO N LESS THAN/EQUAL TO 254); THE NUMBER IS THAT OF THE FIRST FREE REFERENCE TABLE ENTRY, OR, IF NONE ARE FREE, THE NEXT AVAILABLE REFERENCE TABLE ENTRY (CAUSING SPACE ALLOCATION FOR THE ENTRY).

REFERENCE TABLE (256 MAX. ENTRIES)

TYPICAL ENTRY

| REC. 1                                                                                                                                       | R.T. REC. | 0 1 2 3 4 5 6 7 8 9             | 15 % |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------|------|
| RL<br>0                                                                                                                                      | E<br>0    | P /  SEGMENT LENGTH             | 0    |
|                                                                                                                                              | E<br>1    | SEGMENT ADDRESS (REC. #)        | 1    |
| .                                                                                                                                            | E<br>2    | # REC'S FOR SEG. & EXTN. LIST   | 2    |
| .                                                                                                                                            | E<br>3    | F S / / A C X / /  # ENTRY PTS. | 3    |
| RL<br>63                                                                                                                                     | E<br>3    | SLSEGFLAGS                      | 4    |
| (FILE REC1) (1 SECTOR)                                                                                                                       |           |                                 | 5    |
| SEG.NAME -16 BYTE ARRAY<br>WITH NO CHARAC-<br>TER COUNT AND<br>TRAILING BLANKS<br>ADDED.                                                     |           |                                 | 6    |
| REF.MAP -256 BIT ARRAY<br>(INDEXED BY SEG#);<br>BIT SET IF SEG IS<br>REFERENCED DIRECT-<br>LY OR INDIRECTLY.                                 |           |                                 | 7    |
| F SEGMENT DELETED<br>S EXTERNALS SATISFIED<br>A PERMANENTLY ALLOCATED<br>C CORE RESIDENT SEGMENT<br>X MPE SEGMENT<br>P PRIV.INST. IN SEGMENT |           | SEGMENT NAME                    | 10   |
| SLSEGFLAGS:<br>0:1 = 0 => SEG STT IS IN<br>OLD FORMAT<br>= 1 => SEG STT IS IN<br>NEW FORMAT --<br>EXTENDED CSTS                              |           | REFERENCED SEGMENTS<br>BIT MAP  | 20   |

FLAGS:

(0:1) Segment STT format  
(1:15) Reserved

## CHAPTER 11    LOADER

-----

### MPE LOADER

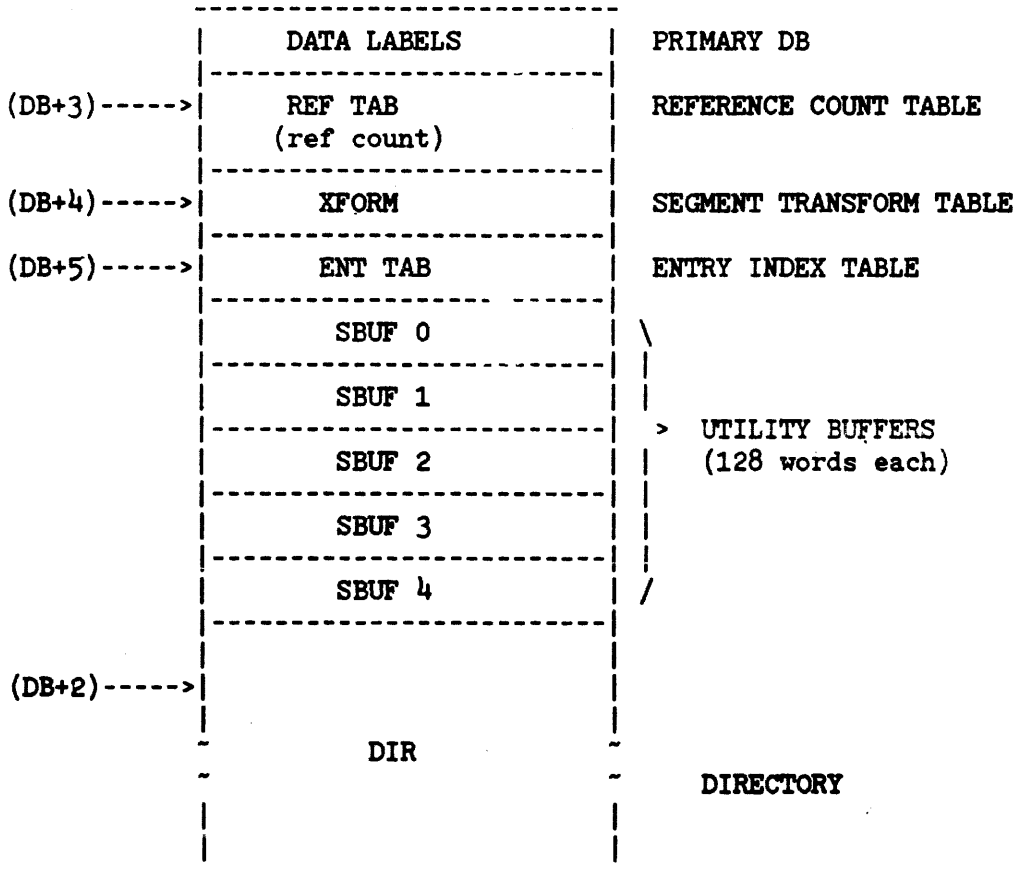
-----

The first area of the CST, pointed to by absolute 0, contains system and library segments. Its size is configurable but it may not contain more than 191 entries. This area is assigned CST numbers 1-%277. The second area is used for programs. The total number of entries in this area is not hardware limited. This area is allocated a block at a time with one program per block. A block may contain from 1 to 63 segments, which will be assigned CST entry numbers %301-%377. The maximum number of segments in a program file is 63 and segments of different programs will have the same CST number. Thus both a block number and a CST# are required to uniquely identify a program segment. A fallout of this is that logical segment=physical CST-%301.

The loader is a system process which will do loads sequentially. If a process needs code to be loaded, it will get the load process' SIR, fill a communication data segment and then awake the loader. Upon completion, the loader will return its status through the communication data segment and then activate the waiting process.

# LOADER SEGMENT ALLOCATION

The order in which storage is allocated for arrays is arbitrary, with one exception: The storage for array DIR must be last in the data segment. This allows the data segment expansion/contraction intrinsics to be applied so that DIR storage may be dynamically allocated.



# LOADER SEGMENT TABLE PRIMARY DB (DST %22)

|    |                                       |          |             |
|----|---------------------------------------|----------|-------------|
| 0  | UTILITY INTEGER                       | S0       |             |
| 1  | DIRECTORY LENGTH                      | DIRLEN   |             |
| 2  | ENTRY TABLE POINTER                   | DIR      |             |
| 3  | REFERENCE COUNT TABLE<br>POINTER      | REFCOUNT |             |
| 4  | CST TO LCST AND FLAG<br>TABLE POINTER | XFORM    |             |
| 5  | CST TO ENTRY INDEX<br>TABLE POINTER   | ENTTAB   |             |
| 6  | SECONDARY ENTTAB<br>POINTER           | ENTP2    |             |
| 7  | ENTRY POINTER                         | ENTP     |             |
| 10 | SECONDARY ENTRY<br>POINTER            | ENTP1    |             |
| 11 | SECOND RECORD DISC<br>BUFFER POINTER  | SBUF0    |             |
| 12 | "                                     | SBUF1    |             |
| 13 | "                                     | SBUF2    |             |
| 14 | "                                     | SBUF3    |             |
| 15 | "                                     | SBUF4    |             |
| 16 | UTILITY INTEGER                       | SI       |             |
| 17 | "                                     | SJ       |             |
| 20 | "                                     | SK       |             |
| 21 | "                                     | SL       |             |
| 22 | "                                     | SM       |             |
| 23 | "                                     | SN       |             |
| 24 | "                                     | SP       |             |
| 25 | "                                     | SQ       | 27   "   SS |
| 26 | "                                     | SR       | 30   "   ST |

# REFERENCE COUNT TABLE

(DB + 3)

|        |
|--------|
| REFTAB |
|--------|

Indexed by CST number; contains the reference count for each code segment. Contains -1 if the CST entry is not allocated.

# SEGMENT TRANSFORM TABLE

(DB + 4)

| LEFT<br>BYTE | RIGHT<br>BYTE |
|--------------|---------------|
| LOG CST#     | FLAGS         |
| XFORM        |               |

Indexed by CST number; contains the file-relative (logical) segment number and segment attributes.

|      |     |     |     |     |     |     |     |     |     |     |     |          |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|-----|-----|-----|
| 0    | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12       | 13  | 14  | 15  |
| ---  | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---      | --- | --- | --- |
| SEG# |     |     |     |     |     |     |     | T   | A   | C   | X   | //////// |     |     |     |

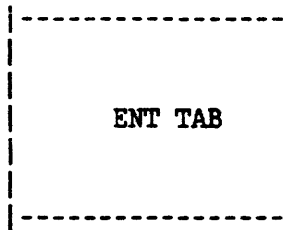
T-Segment Type: System SL =0  
Public SL =1  
Group SL =2  
Program Seg =3

A-Perm.Allocated Segment (1/0)  
C-Core Resident Segment (1/0)  
X-System (MPE) Segment (1/0)



## ENTRY INDEX TABLE

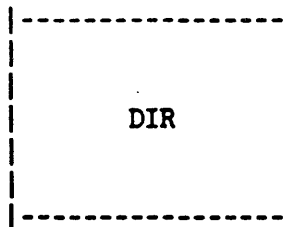
-----  
(DB + 5)



Indexed by CST number; contains the directory index of the file entry corresponding to the CST number.

## DIRECTORY

-----  
(DB + 2)



Accessed by entry key - contains variable length entries, each entry describing a set of CST numbers.

The directory is completely filled with variable length entries. The empty state is represented by a single garbage entry. It is accessed by a sequential search using a double word entry key, or by direct indexing using ENT TAB.

The first word of each entry has the same format and includes an entry type number. In addition, most entries (all entries except type garbage) have an implicit double word entry key. Those entries that have an explicit single word key have an additional word that is implicitly 0. The entry key immediately follows the entry descriptor (first) word.

For file entries, the key is the double word sector number of the file label with the first byte of the double word replaced with the logical device number. For process entries, the key is the single word PIN with the first byte of the single word replaced with the extension number (LOADPROC id number).

# ENTRY POINTER (ENTP)

(DB + 7)

|     | 0                     | 1                                | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11            | 12 | 13 | 14 | 15 |
|-----|-----------------------|----------------------------------|---|---|---|---|---|---|---|---|----|---------------|----|----|----|----|
|     | -----                 |                                  |   |   |   |   |   |   |   |   |    |               |    |    |    |    |
|     | A   LS   F   P     ET |                                  |   |   |   |   |   |   |   |   |    |               |    |    |    |    |
|     | -----                 |                                  |   |   |   |   |   |   |   |   |    |               |    |    |    |    |
| ID1 | 1                     | #wds in garbage entry/process id |   |   |   |   |   |   |   |   |    | ENWG,EPID*,EF |    |    |    |    |
|     | 2                     | Second word of file ID           |   |   |   |   |   |   |   |   |    | EF102         |    |    |    |    |
|     | 3                     | Working set pointer              |   |   |   |   |   |   |   |   |    | EWSP          |    |    |    |    |
|     | 4                     | CST block index                  |   |   |   |   |   |   |   |   |    | ECST          |    |    |    |    |
|     | 5                     | Prog file reference count        |   |   |   |   |   |   |   |   |    | ESHR          |    |    |    |    |
|     | 6                     | #Segments in file                |   |   |   |   |   |   |   |   |    | ESEG          |    |    |    |    |
|     | -----                 |                                  |   |   |   |   |   |   |   |   |    |               |    |    |    |    |

A = Program Allocated  
 LS = Library Search  
 F = File Mode  
 P = Program Mode  
 ET = Entry Type

\*EPID

|                  |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
|------------------|---|---|---|---|---|---|---|------------|---|----|----|----|----|----|----|
| 0                | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8          | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| -----            |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| EXTENSION NUMBER |   |   |   |   |   |   |   | PIN NUMBER |   |    |    |    |    |    |    |
| -----            |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |

EFID1 = First word of file ID

SBUF0 (DB + 9)

-----

|    | 0                            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |               |       |
|----|------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|---------------|-------|
| 0  | F                            | N | Z | / | / | / | / | / | / | / | /  | /  | /  | /  | /  | /  | CAP LIST      | SFAGS |
| 1  | Number segments              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SNRSEGS       |       |
| 2  | Global area size             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SGLOBALSIZE   |       |
| 3  | REC. NR. of global area      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SGLOBALRECD   |       |
| 4  | Rec. nr. of segment list     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSEGMENTRECD  |       |
| 5  | Stack size                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSTACKSIZE    |       |
| 6  | DL size                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SDLSIZE       |       |
| 7  | Max. data seg. size          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SMAXDATA      |       |
| 10 | Rec. nr. of entry point list |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SENTRYRECD    |       |
| 11 | Starting segment nr.         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSTARTINGSEG  |       |
| 12 | Starting PB address          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSTARTINGADR  |       |
| 13 | Starting address of STLT     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSASTLT       |       |
| 14 | Starting address of FLUT     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSAFLUT       |       |
| 15 | Rec. Nr. of external list    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SEXTERNALRECD |       |
| 16 | Starting SST Nr.             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSTARTINGSST  |       |
| 17 | Starting address of trapcom. |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | SSATRAPCOM    |       |

F = Fatal Error

N = Non-Fatal Error

Z = Zero DB

.....

11-8

-----  
//  
//  
// CST bit map  
//  
//  
-----

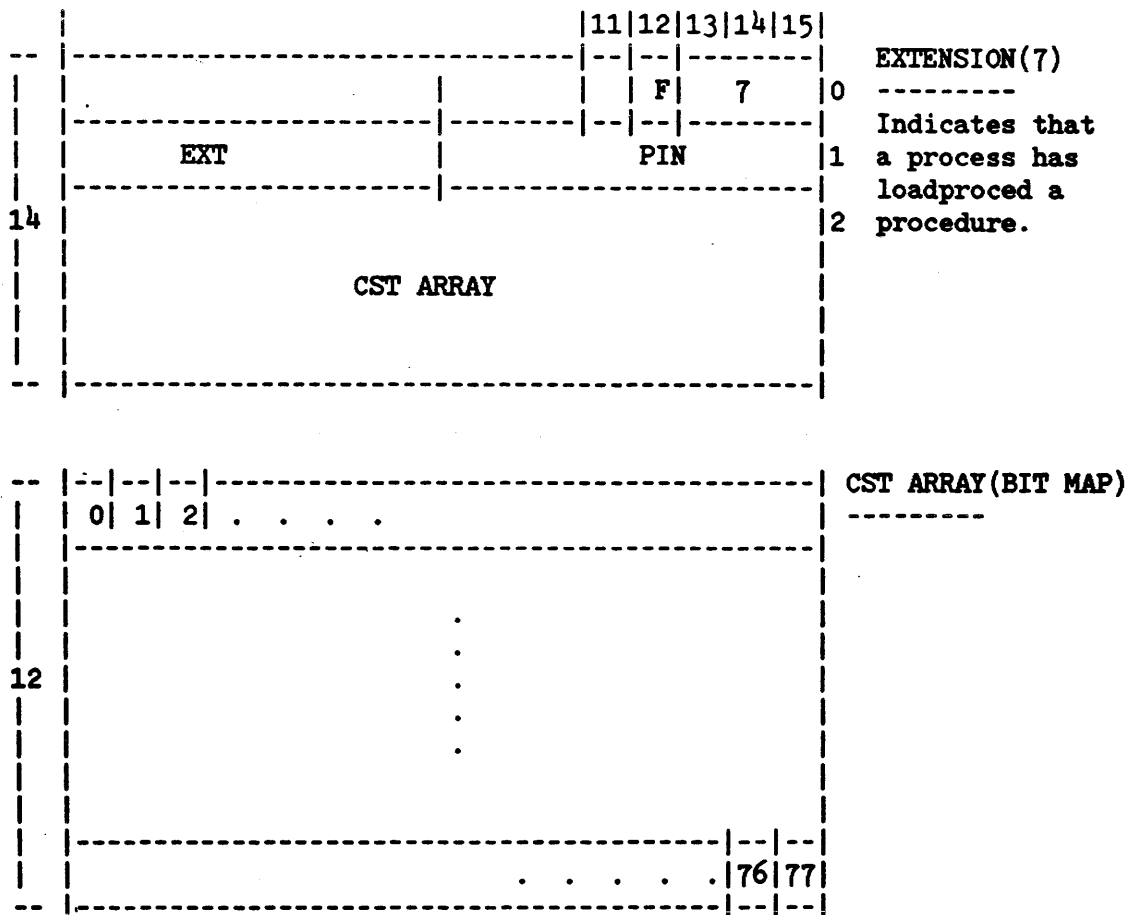
— — — — —

\_\_\_\_\_

|   |   | 10 | 11 | 12  | 13 | 14 | 15 |           |
|---|---|----|----|-----|----|----|----|-----------|
|   |   |    |    |     |    |    |    | SHARER(6) |
|   |   | M  | P  |     | 6  |    |    | 0         |
|   | 0 |    |    | PIN |    |    |    |           |
| 4 |   |    |    |     |    |    |    | 2         |
|   |   |    |    | FID |    |    |    | 3         |
|   |   |    |    |     |    |    |    |           |

Indicates that  
a process is  
running the  
program file.

.....



\_\_\_\_\_

— — —

...

```
word 1-(0:8)=log dev#
word 1-(8:8)=msb of disc address
word 2-=lsb of disc address
```

**M** - executing mode. indicates whether the segments for the file  
- have been copied onto the system disc (1=fast) or not (slow).

## DEFINITIONS (CONT.)

### T - entry type

|   |           |                                                                                                                             |
|---|-----------|-----------------------------------------------------------------------------------------------------------------------------|
| 0 | GARBAGE   | self explanatory                                                                                                            |
| 1 | SL        | indicates which CST's are being used for segments of the file. Currently F=1 and M=0 for all SL entries.                    |
| 2 | PROGRAM   | indicates which CST's are being used for segments of the file and all its externals. Currently M=0 for all program entries. |
| 3 | LOADING   | indicates that a program file (FID) is being loaded on behalf of a process (PIN).                                           |
| 4 | WAITING   | indicates that a process (PIN) is waiting for a program file (FID) to be loaded.                                            |
| 5 | LOADED    | transformed entry of type 4 that is used to return status of load.                                                          |
| 6 | SHARER    | indicates that a process (PIN) is currently running a program file (FID).                                                   |
| 7 | EXTENSION | indicates that a process (PIN) has LOADPROCed a procedure (1<=EXT<=225).                                                    |

P - program mode bit=0 (normal) everything that should be in priv is in priv mode and likewise for non-priv mode.  
=1 (NOPRIV) everything in non-priv mode.



# LOADER CACHE

SYGLOB extension area + %72 contains DST number of cache  
 BUCKETSIZE = %52

## CACHE DATA SEGMENT FORMAT

|                     |   |              |
|---------------------|---|--------------|
|                     | 0 |              |
|                     | 1 | HIT COUNTER  |
|                     | 2 |              |
|                     | 3 | MISS COUNTER |
|                     | 4 | BUCKET 0     |
| 4+ BUCKETSIZE       |   | BUCKET1      |
|                     | . |              |
|                     | . |              |
|                     | . |              |
| 4+94* BUCKETSIZE    |   |              |
| 4+95* BUCKETSIZE -1 |   | BUCKET 94    |

## BUCKET FORMAT

|        |        |                                                                                        |                                              |
|--------|--------|----------------------------------------------------------------------------------------|----------------------------------------------|
| 0      |        | Length of<br>SLDIR1 +1                                                                 |                                              |
| 1      |        | SLDIR 1                                                                                |                                              |
|        |        | Most recently referenced system SL<br>directory entry from this SL directory<br>bucket |                                              |
|        |        | LENGTH OF<br>SLDIR2 + 1                                                                |                                              |
|        |        | SLDIR 2                                                                                |                                              |
|        |        | Second most recently referenced entry                                                  |                                              |
|        |        | .                                                                                      |                                              |
|        |        | .                                                                                      |                                              |
|        |        | LENGTH OF<br>SLDIRN + 1                                                                |                                              |
| BUCKET | SLDIRN |                                                                                        | Nth most recently referenced entry;if        |
| SIZE-1 | -----  |                                                                                        | not complete then indicates end of<br>bucket |

All bucket words are initialized to BUCKETSIZE +1, indicating no entries.

# LOADER COMMUNICATION TABLE (LCT) SYSDB + %220

Form incoming to Loader

|    | 0                                | 1 | 2   | 3 | 4 | 5 | 6 | 7    | 8    | 9 | 10 | 11  | 12 | 13 | 14 | 15      |                                                                                                                                    |  |  |    |  |    |  |
|----|----------------------------------|---|-----|---|---|---|---|------|------|---|----|-----|----|----|----|---------|------------------------------------------------------------------------------------------------------------------------------------|--|--|----|--|----|--|
| 0  | CMD                              |   | LIB |   | M | L |   | PROG |      |   |    | PIN |    |    |    | COMMAND |                                                                                                                                    |  |  |    |  |    |  |
| 1  | LOGICAL DEVICE #                 |   |     |   |   |   |   |      | DISC |   |    |     |    |    |    |         | PROGRAM FILE                                                                                                                       |  |  |    |  |    |  |
| 2  | ADDRESS                          |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         | DESCRIPTOR                                                                                                                         |  |  |    |  |    |  |
| 3  | # CHARS IN NAME                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         | CMD=loader cmd<br>0=load prgm<br>1=load proc<br>2=alloc prog<br>3=alloc proc<br>LIB=library<br>search<br>0=SYS<br>1=PUB<br>2=GROUP |  |  |    |  |    |  |
| 4  |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 5  | PROCEDURE                        |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 6  |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 7  | NAME                             |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 8  |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 9  |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         | M=NONPRIV MODE                                                                                                                     |  |  |    |  |    |  |
| 10 |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         | L=LOAD MAP REQ.                                                                                                                    |  |  |    |  |    |  |
| 11 | WAITER PCB INDEX                 |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         | USER CAPABILITY                                                                                                                    |  |  |    |  |    |  |
| 12 |                                  |   |     |   |   |   |   |      | BA   |   | IA |     | PM |    | MR |         |                                                                                                                                    |  |  | DS |  | PH |  |
| 13 |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 14 | GROUP                            |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 15 | NAME                             |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 16 |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 17 |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 18 | ACCOUNT                          |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 19 | NAME                             |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 20 |                                  |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |
| 21 | PVINFO (see "DIRECTORY ENTRIES") |   |     |   |   |   |   |      |      |   |    |     |    |    |    |         |                                                                                                                                    |  |  |    |  |    |  |

LCT (CONT.)

---

Form returned to WAITER

|   |                              |      |                                  |
|---|------------------------------|------|----------------------------------|
| 0 | F.S. ERROR OR STARTING CST # |      |                                  |
| 1 | LOAD PROCESS ERROR NUMBER    |      |                                  |
| 2 | LOAD MAP FLAG                |      | TRUE IF LMAP<br>PROVIDED         |
| 3 |                              | LDEV | \                                |
| 4 | DISC                         |      | LOAD MAP DISC<br>FILE DISCRIPTOR |
| 5 | ADDRESS                      |      | /                                |



# CHAPTER 12 PRIVATE VOLUMES / SERIAL DISC

MVTAB (Mounted Volume Table)

DST %65

| 1 1 1 1 1 1 |                          |               | 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                  |  |
|-------------|--------------------------|---------------|---------------------------------|------------------|--|
| 0           | entry size               | : max entries | 0                               |                  |  |
| 1           | # of mounted volume sets |               | 1                               |                  |  |
| 2           | ldev                     | : DIRBASE     | 2                               | master volume of |  |
| 3           | of SYSTEM volume set     |               | 3                               | SYS VS is always |  |
| 4           | 0                        |               | 4                               | ldev = 1.        |  |
| 5           | 0                        |               | 5                               |                  |  |
|             |                          |               |                                 | -- entry 0       |  |
|             |                          |               |                                 | (MVTABX = 0)     |  |
| 17          | 0                        |               | 21                              |                  |  |
| 18          | 0                        |               | 22                              |                  |  |
| 19          | 0                        |               | 23                              |                  |  |
| 20          | 0                        |               | 24                              |                  |  |

● ● ● ● ●

```
-- entry n-1
(MVTABX = n-1)
```

# MVTAB (CONT.)

-----

|    |                   |    |                        |                         |
|----|-------------------|----|------------------------|-------------------------|
| 0  | 0:cycl:////////// | 0  |                        |                         |
| 1  | hvol:nvol: ucnt   | 1  |                        |                         |
| 2  | ldev : DIRBASE    | 2  |                        |                         |
| 3  | of volume set     | 3  |                        |                         |
| 4  | generation number | 4  |                        |                         |
| 5  | ldev : VTABX      | 5  |                        |                         |
| 6  | //////////: vcnt  | 6  | - vol entry 0 (double) | -- entry n (MVTABX = n) |
|    |                   |    |                        |                         |
|    |                   |    |                        |                         |
|    |                   |    |                        |                         |
| 19 | ldev : VTABX      | 23 |                        |                         |
| 20 | //////////: vcnt  | 24 | - vol entry 7 (double) |                         |

cycl - cyclical volume index  
(local VTABX) for disc  
space allocation

hvol - highest (ordinal) volume  
index (volume index being the  
volume set's local VTABX) of a  
mounted member of the volume  
set(class).

nvol - # of volumes mounted for the  
volume set(class).

ucnt - # of users having mounted  
the volume set.

vcnt - # of users having mounted  
the volume.

PVUSER (Private Volume User Table)

DST %66

|   |                                 | 1 1 1 1 1 1                     |                                          |
|---|---------------------------------|---------------------------------|------------------------------------------|
|   |                                 | 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                                          |
| 0 | table size (words)              | 0                               |                                          |
| 1 | //////////: # of entries        | 1                               |                                          |
| 2 | bitmask of MVTABX's represented | 2                               |                                          |
| 3 | maximum table size ( words )    | 3                               | -- table head<br>(5 words)               |
| 4 | available pointer               | 4                               |                                          |
|   | op mask : MVTABX                |                                 |                                          |
|   | max users : # pins              |                                 |                                          |
|   | current size of entry           |                                 | - entry head<br>(4 words)                |
|   | PV flags   OP                   |                                 |                                          |
|   | vmask : pin                     |                                 |                                          |
|   | user bind count                 |                                 |                                          |
|   | user mount count                |                                 |                                          |
|   | system bind count               |                                 | - user entry 1                           |
|   | system mount count              |                                 |                                          |
|   | bind names count                |                                 |                                          |
|   | DST # of bind names segment     |                                 |                                          |
|   | vmask : pin                     |                                 |                                          |
|   | user bind count                 |                                 | -- volume set<br>entry 1<br>(MVTABX = j) |
|   | user mount count                |                                 |                                          |
|   | system bind count               |                                 | - user entry 2                           |
|   | system mount count              |                                 |                                          |
|   | bind names count                |                                 |                                          |
|   | DST # of bind names segment     |                                 |                                          |



.....

12-5

(Created and managed via PVUSER Table)

| 1 1 1 1 1 1                     |                        |    |
|---------------------------------|------------------------|----|
| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                        |    |
| 0                               | max segment length     | 0  |
| 1                               | current segment length | 1  |
| 2                               | 0                      | 2  |
| -- entry 0                      |                        |    |
| 8                               | 0                      | 10 |
| 0                               | bind count             | 0  |
| 1                               | GROUP                  | 1  |
| 2                               |                        | 2  |
| 3                               | NAME                   | 3  |
| 4                               |                        | 4  |
| -- entry 1                      |                        |    |
| 5                               | ACCOUNT                | 5  |
| 6                               |                        | 6  |
| 7                               | NAME                   | 7  |
| 8                               |                        | 10 |

# BIND NAMES DATA SEGMENT (CONT.)

|   |            |    |            |
|---|------------|----|------------|
| 0 | bind count | 0  |            |
| 1 |            | 1  |            |
| 2 | GROUP      | 2  |            |
| 3 | NAME       | 3  |            |
| 4 |            | 4  | -- entry n |
| 5 |            | 5  |            |
| 6 | ACCOUNT    | 6  |            |
| 7 | NAME       | 7  |            |
| 8 |            | 10 |            |
|   | a          |    |            |
|   | v          |    |            |
|   | a          |    |            |
|   | i          |    |            |
|   | l          |    |            |
|   | a          |    |            |
|   | b          |    |            |
|   | l          |    |            |
|   | e          |    |            |

# SERIAL DISC GAP TABLE

-----

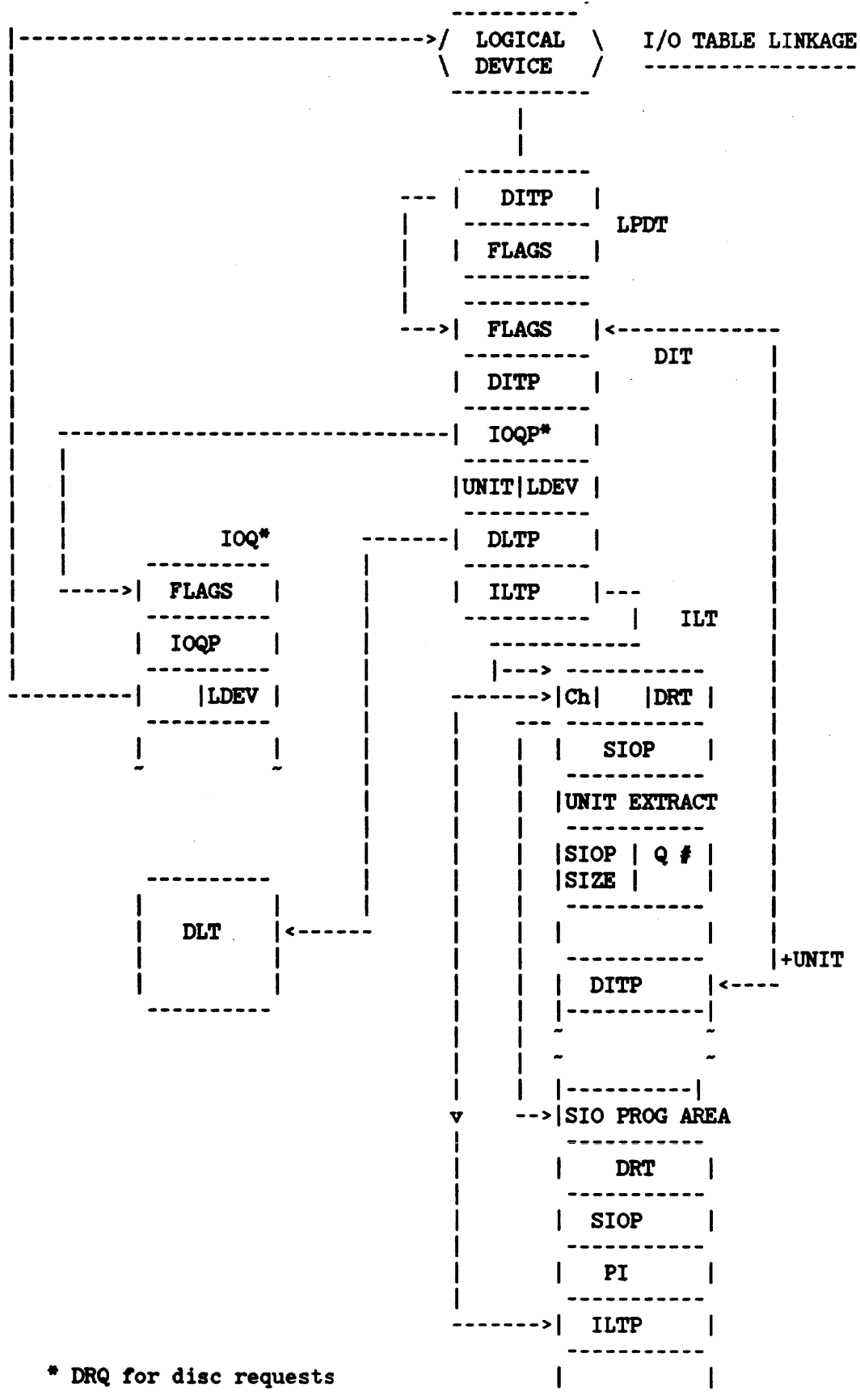
|   |                                 |   |                  |
|---|---------------------------------|---|------------------|
| 0 | SECTOR ADDRESS OF START OF DATA | \ |                  |
| 1 | UNUSED                          |   | GAP TABLE HEADER |
| 2 | UNUSED                          |   |                  |
| 3 | UNUSED                          | / |                  |
|   | TYPE   SECTOR ADDRESS           |   | ENTRY (2WD.)     |
|   | -----                           | / |                  |
|   | TYPE   SECTOR ADDRESS           |   | ENTRY (2 WD.)    |
|   | -----                           | / |                  |
|   | .                               |   |                  |
|   | .                               |   |                  |
|   | .                               |   |                  |

## TYPE:

- 0 - END OF FILE MARK
- 1 - LAST RECORD PHYSICALLY WRITTEN
- 2 - START SECTOR OF "HOLE"
- 3 - END SECTOR OF "HOLE"
- 4 - START SECTOR OF "CONTIGUOUS BLOCK"
- 5 - END SECTOR OF "CONTIGUOUS BLOCK"
- 6 - END OF TAPE MARK
- 7 - END OF TABLE MARKER

# SERIAL DISC PACK FORMAT

|                            |                             |                                              |
|----------------------------|-----------------------------|----------------------------------------------|
|                            | DISC LABEL                  | TRACK 0 SECTOR 0                             |
|                            | DEFECTIVE<br>TRACKS TABLE   | TRACK 0 SECTOR 1                             |
|                            | RESERVED                    | TRACK 0 SECTOR 2-3                           |
|                            | GAP TABLE                   | TRACK 0 SECTOR 4                             |
|                            | GAP TABLE<br>EXTENSION AREA | REST OF TRACK 0                              |
| LOAD POINT>                | DATA STORAGE<br>AREA        | TRACK 1 SECTOR 0<br>through<br>LAST TRACK -1 |
| END OF-----><br>TAPE REFL. | DATA OVERRUN                | LAST TRACK                                   |



\_\_\_\_\_

SIOP - absolute address of SIO program  
PI - interrupt handler label  
DBI - this is the absolute address of the ILT

**ABS**

| DRT ENTRY ON /33, /44 |      |
|-----------------------|------|
| SIOP                  | <--- |
| DBI                   |      |
| PI                    |      |
| Channel Flags         |      |

## DRIVER LINKAGE TABLE (DLT)

DST %17

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |       |
|---|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-------|
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 0 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | DPROC |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 1 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | DMNTR |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 2 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | DINIT |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 3 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | DCOMP |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 4 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | DINTP |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 5 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | DTYPE |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 6 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
| 7 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |
|   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |       |

There is one DLT for each type of driver. A pointer in the DIT allows different devices on a controller to have different drivers and interrupt handlers.

DPROC.QNUMB - This field contains the I/O process request queue number for type 2 drivers. Zero for all other types.

.(8:1).DRVFRZN (DF) - Driver code frozen. Set by MAM when the driver code segment has been made present and frozen from a request from SIODM.

.(9:1).MAMERRORC (MC) - MAM Error on Code Makepresent

.(10:1).CORERES (CR) - If set both initiator and completor code are core resident.

.(14:2).DRVRTYPE (MTVP) - DRIVER/MONITOR TYPE

- 0 - not used
- 1 - driver can be executed on any stack
- 2 - driver can be executed in the user process or in the I/O process identified by IDNUMB
- 3 - run only in process whose PCB number is in IDNUMB

DMNTR - I/O Monitor Plabel.

DINIT - Driver Initiator Procedure Plabel.

DCOMP - Driver Completor Procedure Plabel.

DINTP - Special interrupt hanler Plabel. This procedure is called by GIP if ISPEC is set DFLAG. No other action is taken by GIP except to set the Interrupt Status in DSTAT.

DTYPE.DITSIZE - The length of the DIT in words for this driver.



# LOGICAL PHYSICAL DEVICE TABLE (LPDT)

LPDSTDST=%15  
LPDTSIR=%11

| HIGH ENTRY # | ENTRY SIZE    |                               |
|--------------|---------------|-------------------------------|
|              | SERV. REQ INT |                               |
| ~            |               | ~                             |
| ~            |               | ~                             |
| 0            |               | \                             |
|              | -- same --    | NORMAL DEVICE ENTRY           |
|              |               | /                             |
| ~            |               | ~                             |
| ~            |               | ~                             |
| 1            | XDD INDEX     | \                             |
|              | -- same --    | VIRTUAL DEVICE ENTRY-ASSIGNED |
|              |               | IO = 0    IDD                 |
|              |               | = 1    ODD                    |
|              |               | /                             |
| ~            |               | ~                             |
| ~            |               | ~                             |
| 1            | 0             | \                             |
|              | -- same --    | VIRTUAL DEVICE FREE ENTRY     |
|              |               | /                             |

# LPDT (CONT.)

| LPDT ENTRY |         |                                 |      |     |     |      |   |     |   |   |     |     |         |    |       |
|------------|---------|---------------------------------|------|-----|-----|------|---|-----|---|---|-----|-----|---------|----|-------|
|            | 0       | 1                               | 2    | 3   | 4   | 5    | 6 | 7   | 8 | 9 | 10  | 11  | 12      | 13 | 14 15 |
| 0          | V       | DITP/VIRTUAL DEVICE INFORMATION |      |     |     |      |   |     |   |   |     |     |         |    |       |
|            | FLAG    |                                 |      |     |     |      |   |     |   |   |     |     |         |    |       |
|            |         |                                 |      | CY  |     |      |   |     |   |   | BR  |     |         |    |       |
|            |         |                                 |      | --- | DUP | INTR |   |     |   |   | --- | --- |         |    |       |
| 1          | DRSTATE | JOBS                            | DATA | BOT |     |      |   | EOF |   |   | DR  |     | SUBTYPE |    |       |
|            |         |                                 |      | --- | --- | ---  |   |     |   |   | --- | --- |         |    |       |
|            |         |                                 |      | PV  | M   | RV   |   |     |   |   | SF  | FS  |         |    |       |

There is one two-word entry in the LPDT for each Logical Device.

The base of the entry for a given Logical Device is equal to the Logical Device number multiplied by two. The physical device characteristics are maintained in the DIT and ILT.

The field definitions for each entry are:

## WORD 0 --

- VFLAG - Virtual device flag
- DITP - When VFLAG = 0, SYSDB relative pointer to the DIT  
1, Virtual device information

## WORD 1 --

The following fields are defined for all devices:

- DRSTATE - Device Recognition State
  - 0-Not owned
  - 1-Owned or recognized
  - 2-Service requested - set by driver upon unexpected interrupt and awake DEVREC
  - 3-Service granted - set by DEVREC  
(sequence for logon:0-2-3-1)
- JOBS - Accepting Jobs or Sessions
- DATA - Accepting Data
- EOF - End of File condition
  - 0-No EOF
  - 1-HARDWARE EOF
  - 2-:DATA
  - 3-:EOD
  - 4-:HELLO
  - 5-:BYE
  - 6-:JOB
  - 7-:EOJ

## LPDT (CONT.)

----

SUBTYPE - Device subtype. For tapes, the SUBTYPE is divided into two subfields as follows:

WORD1.(13:3) - actual device subtype  
WORD1.(12:1) - 0 = operator allocation  
              1 = automatic allocation

The definitions for bits 4,5,6,10, and 11 in word 1 are device dependent.

For terminal-like devices only,

CY - Control Y is allowed and has been detected  
BR - Break detected or ignore break if main running

For tape drives only,

BOT - Tape is at load point or no tape mounted  
DR - DEVREC is performing Automatic Volume Recognition (AVR) on tape drive or suppress AVR on job/data-accepting tapes

For all devices except non-system domain discs,

DUP - Duplicative  
INTR - Interactive

For non-system domain disc drives only,

PV - Private volume  
M - Mounted volume  
RV - Reserved volume for multiple pack mount requirement  
SF - Serial or foreign disc physically and logically mounted  
FS - If SF = 1, then: FS = 0, Serial disc  
                      FS = 1, Foreign disc

# LPDT (CONT.)

----

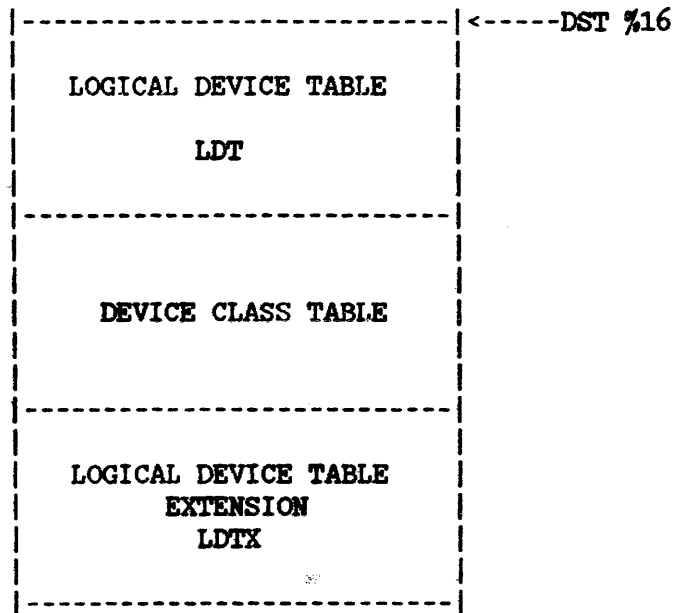
|                 |                                     |
|-----------------|-------------------------------------|
| 0               |                                     |
| 0               | V                                   |
|                 | V=0 then DITPOINTER                 |
| 1               | V                                   |
|                 | V=1 then Virtual Device Entry Info. |
| -- as before -- |                                     |

The first word of each entry in the LPDT has changed to reflect the addition of Virtual Devices.

A "real" logical device (ie. one on which an ATTACHIO call may be performed) has the sign bit set to "zero".

A "virtual" logical device has the sign bit set to "one". Thus anyone who loads the DIT pointer for use must check this sign bit.

# OVERVIEW OF DEVICE TABLES



# LOGICAL DEVICE TABLE

(Indexed by Log Dev#)

DST 16(8) = 14(10)

SIR 12(8) = 10(10)

## ZERO ENTRY FORMAT

|   | 0                                                               | 1  | 2 | 3  | 4 | 5  | 6 | 7  | 8            | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
|---|-----------------------------------------------------------------|----|---|----|---|----|---|----|--------------|----|----|----|----|----|----|----|
|   |                                                                 | -- |   | -- |   | -- |   | -- |              | -- |    | -- |    | -- |    | -- |
| 0 | HIGHEST ENTRY #                                                 |    |   |    |   |    |   |    | ENTRY SIZE=5 |    |    |    |    |    |    |    |
|   | -----                                                           |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
| 1 | POINTER TO FIRST DEVICE CLASS ENTRY<br>(RELATIVE TO TABLE BASE) |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
|   | -----                                                           |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
| 2 | NUMBER OF DEVICE CLASS ENTRIES                                  |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
|   | -----                                                           |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
| 3 | SIZE OF DEVICE CLASS TABLE                                      |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
|   | -----                                                           |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
| 4 | //////////////////// STREAMS DEVICE NUMBER                      |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |
|   | -----                                                           |    |   |    |   |    |   |    |              |    |    |    |    |    |    |    |

## TYPICAL ENTRY FORMAT

|                        |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
|------------------------|---|---|---|---|----|---|---------------------|-----------------------|-----------|-------------|----|----|----|----|----------------------------------------------------|---|
| 0                      | 1 | 2 | 3 | 4 | 5  | 6 | 7                   | 8                     | 9         | 10          | 11 | 12 | 13 | 14 | 15                                                 |   |
| -----                  |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
| FILE USE COUNT         |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    | 0                                                  |   |
| -----                  |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
| VOL TABLE INDEX IF DEV |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    | *or process # of<br>I/O spooler for<br>this device |   |
| TYPE<8 OTHERWISE *     |   |   |   |   |    |   |                     | CONTROL Y PIN         |           |             |    |    |    |    |                                                    | 1 |
| MAIN PROCESS PIN #     |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
| -----                  |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
| RECORD WIDTH           |   |   |   |   |    |   |                     | CS                    | FO        | DEVICE TYPE |    |    |    |    |                                                    | 2 |
| -----                  |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
|                        |   |   |   |   |    |   |                     | DEFAULT OUTPUT DEVICE |           |             |    |    |    |    | 3                                                  |   |
| SS                     | F | M | R |   | HT | C | OR CLASS INDEX(C=1) |                       |           |             |    |    |    |    |                                                    |   |
| -----                  |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |
|                        |   |   |   |   |    |   |                     | S                     |           |             |    |    |    |    |                                                    | 4 |
| MISC                   |   |   |   |   |    |   |                     | Q                     | VDD INDEX |             |    |    |    |    |                                                    |   |
| -----                  |   |   |   |   |    |   |                     |                       |           |             |    |    |    |    |                                                    |   |

\*or process # of  
I/O spooler for  
this device

LDT (CONT.)

---

SS. . . spool state  
    0 not spooled                    reserved  
    1 spooled input                for  
    2 spooled output               spooling  
SQ = 1 SPOOLING ENABLED  
C . . . default device is class index      CS . . . CS device  
F . . . avail to system                    FO . . . Special Forms  
M . . . avail to diagnostics               HT . . . 0 = Header/Trailer on  
R . . . down requested                      1 = Header/Trailer off  
MISC. . . miscellaneous information, device dependent:

- 1) For terminal-like devices, default terminal type to be used when not specified in HELLO command.
- 2) For variable density tape drives, contains density information.  
    WORD4.(1:3) -- actual tape density  
        0 = density not yet determined  
        1 = 1600 BPI  
        2 = 6250 BPI  
    WORD4.(4:3) -- density requested in FOPEN for writes to tape, unlabelled tapes only  
        0 = no FOPEN with write access yet  
        1 = 1600 BPI  
        2 = 6250 BPI

## DEVICE CLASS TABLE

(Sequentially Organized)

### TYPICAL ENTRY FORMAT

T=TERMINAL  
ACCESS  
BIT

SQ = Spool Queue bit

NOTE: The device class table is in the same data segment (DST 16(8) as the LDT. ie., the LDT consists of three separate tables.

1. logical device table and
2. device class table
3. LDT Extension



# LOGICAL DEVICE TABLE EXTENSION

DST 16 = 14  
8 10

SIR 12 = 10  
8 10

## ZERO ENTRY

|   | 0               | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8          | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|-----------------|---|---|---|---|---|---|---|------------|---|----|----|----|----|----|----|
| 0 | HIGHEST ENTRY # |   |   |   |   |   |   |   | ENTRY SIZE |   |    |    |    |    |    |    |
| 1 |                 |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| 2 |                 |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| 3 |                 |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| 4 |                 |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |

## TYPICAL ENTRY

| 0                        | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13   | 14 | 15 |
|--------------------------|---|---|---|---|---|---|---|---|---|----|----|----|------|----|----|
| S                        |   |   |   |   |   |   |   |   |   |    |    |    | TBRC |    |    |
| SERIAL DISC BUFFER XDS # |   |   |   |   |   |   |   |   |   |    |    |    |      |    |    |
| Reserved                 |   |   |   |   |   |   |   |   |   |    |    |    |      |    |    |
| Reserved                 |   |   |   |   |   |   |   |   |   |    |    |    |      |    |    |
|                          |   |   |   |   |   |   |   |   |   |    |    |    |      |    |    |
|                          |   |   |   |   |   |   |   |   |   |    |    |    |      |    |    |

S.....Seek ahead enable/disable flag.  
TBRC....Terminal's baud rate code

# INTERRUPT LINKAGE TABLE (ILT)

DST %52

## ILT FOR SERIES II/III

|     | 0 | 1                                                                                      | 2 | 3 | 4        | 5 | 6 | 7 | 8 | 9 | 10 | 11         | 12 | 13 | 14 | 15 |         |
|-----|---|----------------------------------------------------------------------------------------|---|---|----------|---|---|---|---|---|----|------------|----|----|----|----|---------|
| 0   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICPVA0  |
| 1   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICPVA01 |
| 2   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICPVA02 |
| 3   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICPVA03 |
| 4   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICPVA04 |
| 5   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICPVA05 |
| 6   |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ISRQL   |
| 7   |   | M                                                                                      |   |   | CHANQUE  |   |   |   |   |   |    | DRT NUMBER |    |    |    |    | IDRTN   |
| %10 |   | SYSDB relative pointer to I/O program area.                                            |   |   |          |   |   |   |   |   |    |            |    |    |    |    | ISIOP   |
| %11 |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ISTAP   |
| %12 |   | single instruction that is executed to extract the device unit number from the status. |   |   |          |   |   |   |   |   |    |            |    |    |    |    | IUNIT   |
| %13 |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | ICDP    |
| %14 |   |                                                                                        |   |   | SIOPSIZE |   |   |   |   |   |    | CQUEN      |    |    |    |    | IQUEUE  |
| %15 |   |                                                                                        |   |   |          |   |   | 0 |   |   |    |            |    |    |    |    | IFLAG   |
| %16 |   | SYSDB relative DIT pointer for unit 0                                                  |   |   |          |   |   |   |   |   |    |            |    |    |    |    | IDITPO  |
|     |   |                                                                                        |   |   |          |   |   | . |   |   |    |            |    |    |    |    |         |
|     |   |                                                                                        |   |   |          |   |   | . |   |   |    |            |    |    |    |    |         |
|     |   |                                                                                        |   |   |          |   |   | . |   |   |    |            |    |    |    |    |         |
|     |   | SYSDB relative DIT pointer for unit n                                                  |   |   |          |   |   |   |   |   |    |            |    |    |    |    | IDITPN  |
|     |   | Seekmask (Disc only)                                                                   |   |   |          |   |   |   |   |   |    |            |    |    |    |    |         |
|     |   | I/O<br>Program<br>Area                                                                 |   |   |          |   |   |   |   |   |    |            |    |    |    |    |         |

SIOPSIZE - SIO PROGRAM SIZE / 2.

ILT FOR SERIES 30/33/44 & SERIES II/III (HP-IB)

|     | 0                                                                                                          | 1       | 2  | 3 | 4  | 5 | 6     | 7 | 8    | 9 | 10 | 11     | 12 | 13 | 14     | 15 |         |
|-----|------------------------------------------------------------------------------------------------------------|---------|----|---|----|---|-------|---|------|---|----|--------|----|----|--------|----|---------|
| 0   | Channel                                                                                                    |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICPVA0  |
| 1   | Program                                                                                                    |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICPVA01 |
| 2   | Variable                                                                                                   |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICPVA02 |
| 3   | Area (ICPVA)                                                                                               |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICPVA03 |
| 4   | DMA Abort                                                                                                  |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICPVA04 |
| 5   | Address                                                                                                    |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICPVA05 |
| 6   | 0                                                                                                          |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ISRQL   |
| 7   | M                                                                                                          | CHANQUE |    |   |    |   |       |   | CHAN |   |    | DEV    |    |    | ICNTRL |    |         |
| %10 | SYSDB relative pointer to channel program area.                                                            |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ISIOP   |
| %11 | SYSDB relative pointer to status return area.                                                              |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ISTAP   |
| %12 | single instruction that is executed to extract the device unit number from the status pointed to by ISTAP. |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | IUNIT   |
| %13 | SYSDB relative DIT pointer of the device currently using the channel to perform a data operation.          |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | ICDP    |
| %14 | SIOPSIZE                                                                                                   |         |    |   |    |   | CQUEN |   |      |   |    | IQUEUE |    |    |        |    |         |
| %15 | RW                                                                                                         |         | WP |   | IG |   |       |   |      |   |    | HCUNIT |    |    |        |    | IFLAG   |
| %16 | SYSDB relative DIT pointer for unit 0                                                                      |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | IDITP0  |
|     | .                                                                                                          |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    |         |
|     | .                                                                                                          |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    |         |
|     | .                                                                                                          |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    |         |
|     | SYSDB relative DIT pointer for unit n                                                                      |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    | IDITPN  |
|     | Program status return area pointed to by ISTAP                                                             |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    |         |
|     | Seekmask (Disc only)                                                                                       |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    |         |
|     | I/O Program Area                                                                                           |         |    |   |    |   |       |   |      |   |    |        |    |    |        |    |         |

# ILT (cont.) - TERMINOLOGY

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- IPCVA - These four words comprise the channel program variable area where information is stored concerning a channel program Interrupt instruction or abort. CPVA0 should be used only for channel program aborts.
- ICPVA4 - Words 4 and 5 contain DMA address, when channel program aborts during DMA transfer.
- ISRQL - Serial poll request queue length. Series 33 currently does not support any serial poll devices. This should always be zero.
- ICNTRL - Contains controller information.
  - .M If set, the controller is sharing a software channel resource in order to limit bandwidth.
  - .CHNQ The software channel resource number.
  - .DRTN The DRT number for a Series 33 device is equivalent to:
    - .CHAN - channel number (4 most significant bits of DRTN)
    - .DEV - device number (3 least significant bits of DRTN)
- IFLAG - Used for controller flags.
  - .RW Runwait flag. An idle channel program should be started when there are no active requests to process.
  - .WP Waitprog flag. An idle channel program has been started for this controller. This bit is reset by an interrupt.
  - .IG Ignorehi flag. An HIOP instruction has been issued against this controller, but the channel program was not in a wait statement. Therefore, ignore the interrupt generated by the channel code when this program halts.
- .HCUNIT Highest configured unit number for this controller.

\_\_\_\_\_

```

DIT for Series II/III

 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
0 | T | D | AC | RQ | SI | MU | SP | IO | IA | NO | ST | NS | STATE | DFLAG
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
1 | SYSDB relative pointer to the DIT for the next | DLINK
 | device requesting this resource or service |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
2 | SYSDB relative pointer to the first IOQ in | DIOQP
 | request list for this device |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
3 | IOT | Phys. unit # | Logical device number | DLDEV
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
4 | SYSDB relative pointer to Device Linkage Table | DDLTP
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
5 | SYSDB relative pntr to Interrupt Linkage Table | DILTP
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
6 | Controller hardware status | DSTAT
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
7 | Hardware error status. Set when the driver | DSERR
 | detects an error. Whenever <>0, the driver |
 | monitor logs an I/O error and clears this word |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| Device Dependent Area | (DTIME)
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

-----

DFLAG - DEVICE RELATIVE FLAGS

T SET IF DEVICE IS A TERMINAL.  
D SET IF DEVICE IS A DISC.  
AC ACTIVE BIT. 1 IMPLIES A MONITOR CURRENTLY SERVICING THIS DEVICE.  
RQ REQUEST BIT. 1 IMPLIES SERVICE REQUESTED WHILE MONITOR IS ACTIVE.  
MU IF SET, MULTIPLE UNIT CONTROLLER.  
IO IF SET, THEN A CHANNEL PROGRAM IS CURRENTLY EXECUTING.  
IA IF SET, AN INTERRUPT OR RESPONSE HAS OCCURRED.  
NO IF SET, DEVICE IS IN A NOT READY OR OPERATOR WAIT.  
SI SPECIAL INTERRUPT HANDLER  
SP SIO PREEMPTION  
ST START WAIT CHANNEL PROGRAM  
NS DO NOT SHORT WAIT THIS DISC

STATE CURRENT DRIVER STATE AS DEFINED BY THE MONITOR.

ALLOWABLE STATES ARE:

0 - START REQUEST  
1 - NOT USED (BUT RESERVED)  
2 - CALL DRIVER INITIATOR  
3 - CALL DRIVER COMPLETOR  
4 - NOT USED (BUT RESERVED)  
5 - COMPLETE REQUEST  
6 - UNEXPECTED INTERRUPT OCCURED  
7 - START OPERATOR INTERVENTION WAIT  
%10 - WAITING (ON OPERATOR). RESTART AT 0  
%11 - WAITING (DATA MAKEPRESENT/FREEZING)  
%12 - WAITING (INITIATOR CODE MAKEPRESENT/FREEZE)  
%13 - WAITING (FOR COMPLETION INTERRUPT)  
%14 - WAITING (FOR DEVICE CONTROLLER AVAILABILITY)  
%15 - NOT USED (BUT RESERVED)  
%16 - WAITING (INITIATOR CODE MAKEPRESENT)  
%17 - WAITING (COMPLETOR CODE MAKEPRESENT)

IOT - I/O System type 0-Series II/III I/O System  
1-HP-IB  
2-unused  
3-unused

-----

|   | 0 | 1                                                                                                                                    | 2 | 3            | 4 | 5  | 6 | 7  | 8                     | 9  | 10 | 11 | 12 | 13 | 14 | 15 |   |    |   |       |   |    |   |    |         |       |   |       |
|---|---|--------------------------------------------------------------------------------------------------------------------------------------|---|--------------|---|----|---|----|-----------------------|----|----|----|----|----|----|----|---|----|---|-------|---|----|---|----|---------|-------|---|-------|
|   | + | +                                                                                                                                    | + | +            | + | +  | + | +  | +                     | +  | +  | +  | +  | +  | +  | +  |   |    |   |       |   |    |   |    |         |       |   |       |
| 0 |   | T                                                                                                                                    |   | D            |   | AC |   | RQ |                       | SI |    | MU |    | 0  |    | IO |   | IA |   | NO    |   | ST |   | NS |         | STATE |   | DFLAG |
|   | + | +                                                                                                                                    | + | +            | + | +  | + | +  | +                     | +  | +  | +  | +  | +  | +  | +  | + | +  | + | +     | + | +  | + | +  | +       | +     | + | +     |
| 1 |   | SYSDB relative pointer to the DIT for the next device requesting this resource or service                                            |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | DLINK   |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
| 2 |   | SYSDB relative pointer to the first IOQ in request list for this device                                                              |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | DIOQP   |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
| 3 |   | IOT                                                                                                                                  |   | Phys. unit # |   |    |   |    | Logical device number |    |    |    |    |    |    |    |   |    |   | DLDEV |   |    |   |    |         |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
| 4 |   | SYSDB relative pointer to Device Linkage Table                                                                                       |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | DDLTP   |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
| 5 |   | SYSDB relative pntr to Interrupt Linkage Table                                                                                       |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | DILTP   |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
| 6 |   | Controller Hardware Status                                                                                                           |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | DSTAT   |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
| 7 |   | Hardware error status. Set when the driver detects an error. Whenever <>0, the driver monitor logs an I/O error and clears this word |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | DSERR   |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |
|   |   | Device Dependent Area                                                                                                                |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   |    | (DTRQX) |       |   |       |
|   | + | +                                                                                                                                    |   |              |   |    |   |    |                       |    |    |    |    |    |    |    |   |    |   |       |   |    |   | +  |         |       |   |       |

DTRQX      Used by some device drivers, it denotes timer request index.

-----

## DFLAG - DEVICE RELATIVE FLAGS

T SET IF DEVICE IS A TERMINAL.  
D SET IF DEVICE IS A DISC.  
AC ACTIVE BIT. 1 IMPLIES A MONITOR CURRENTLY SERVICING THIS DEVICE.  
RQ REQUEST BIT. 1 IMPLIES SERVICE REQUESTED WHILE MONITOR IS ACTIVE.  
MU IF SET, MULTIPLE UNIT CONTROLLER.  
IO IF SET, THEN A CHANNEL PROGRAM IS CURRENTLY EXECUTING.  
IA IF SET, AN INTERRUPT OR RESPONSE HAS OCCURRED.  
NO IF SET, DEVICE IS IN A NOT READY OR OPERATOR WAIT.  
ST IF SET, AN IDLE CHANNEL PROGRAM SHOULD BE STARTED FOR THIS DEVICE.  
SI SPECIAL INTERRUPT HANDLER  
NS DO NOT SHORT WAIT THIS DISC  
STATE CURRENT DRIVER STATE AS DEFINED BY THE MONITOR.

## ALLOWABLE STATES ARE:

0 - START REQUEST  
1 - NOT USED (BUT RESERVED)  
2 - CALL DRIVER INITIATOR  
3 - CALL DRIVER COMPLETOR  
4 - NOT USED (BUT RESERVED)  
5 - COMPLETE REQUEST  
6 - UNEXPECTED INTERRUPT OCCURED  
7 - START OPERATOR INTERVENTION WAIT  
%10 - WAITING (ON OPERATOR). RESTART AT 0  
%11 - WAITING (DATA MAKEPRESENT/FREEZING)  
%12 - WAITING (INITIATOR CODE MAKEPRESENT/FREEZE)  
%13 - WAITING (FOR COMPLETION INTERRUPT)  
%14 - WAITING (FOR DEVICE CONTROLLER AVAILABILITY)  
%15 - NOT USED (BUT RESERVED)  
%16 - WAITING (INITIATOR CODE MAKEPRESENT)  
%17 - WAITING (COMPLETOR CODE MAKEPRESENT)

IOT - I/O System type 0-Series II/III I/O System  
1-HP-IB  
2-unused  
3-unused



# DIT for SIO Devices

|   | 0                          | 1    | 2   | 3    | 4 | 5    | 6     | 7    | 8   | 9    | 10 | 11    | 12 | 13    | 14 | 15 |       |
|---|----------------------------|------|-----|------|---|------|-------|------|-----|------|----|-------|----|-------|----|----|-------|
| 0 | TERM                       | DISC | ACT | REQ  |   | M    | SIO   | IO   | IAK | M    | NT |       |    | STATE |    |    | DFLAG |
|   |                            |      |     |      |   | UNIT | PREMP | PROG |     | HEAD | RY |       |    |       |    |    |       |
| 1 | NEXT DITP                  |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DLINK |
| 2 | IOQP                       |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DIOQP |
| 3 | IOT                        |      |     | UNIT |   |      |       |      |     |      |    | LDEVN |    |       |    |    | DLDEV |
| 4 | DLTP                       |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DLTP  |
| 5 | ILTP                       |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DILTP |
| 6 | Controller Hardware Status |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DSTAT |
| 7 | Hardware Error Status      |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DSERR |
| 8 |                            |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | DTRQX |
| ~ |                            |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | ~     |
| ~ |                            |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    | ~     |
|   | DRIVER DEPENDENT DIT AREA  |      |     |      |   |      |       |      |     |      |    |       |    |       |    |    |       |

- DFLAG.TERMINAL - Device is a terminal
- .DISC - Device is a Disc (Bit 0 = 0)
- .ACTIVE - A monitor is currently servicing this device
- .REQUEST - Service requested while monitor was active
- .MUNIT - device controller servicing multiple units
- .SIOPREMP - If set then a preemptive request has been queued for this device. Preempt code is set in IOQ.
- .IOPROG - I/O program in progress. Decrement SIOCOUNTER and check for multi-channel when complete
- .IAK - Interrupt or Response has occurred.
- .M HEAD - Moving head disc
- .NT RDY - Not ready for SIO. SIODM holds off next SIO until ALLOWPOLL is done.
- DTRQX - Used by some device drivers, it denotes timer request index.

# DIT FOR SIO DEVICES (CONT.)

- 
- DFLAG.STATE** - this quantity specifies the next action to be taken in servicing the request.
- 0-new - start request.
  - 1-not used.
  - 2-call Driver Initiator Procedure
  - 3-call Driver Completor Procedure
  - 5-complete request
  - 6-device recognition
  - 7-start operator intervention wait (%10)
  - %10-restart request on interrupt
  - %11-wait for data to be frozen then state 2
  - %12-wait for driver code to be frozen then state 2
  - %13-call completor on interrupt
  - %14-wait for device controller
  - %15-not used
  - %16-wait for initiator make present then state 2
  - %17-wait for completor make present then state 3
- DLINK** - SYSDB relative pointer to the DIT for the next device requesting this resource or service.
- DIOQP** - SYSDB relative pointer to the first IOQ in the request list for this device
- DLDEV.LDEVN** - Logical Device Number
- .UNIT** - unit number of the physical device.
- .IOT** - IO type 0=> Series III I/O, 1=> HPiB I/O
- DDLTP** - SYSDB relative pointer to the DLT.
- DILTP** - SYSDB relative pointer to the ILT.
- DSTAT** - interrupt status for this device. Set each time the device interrupts.
- DSERR** - Hardware Device Controller Status. Set when the driver detects an error. whenever not zero SIODB logges an I/O error and clears this word.
- DTIME** - time out completed flags. If a timeout occurs in response to a timer request type %20 (I/O request), the sign bit is set in this word. The IA bit in DFLAG is also set, and the monitor for this device is awakened. (Only used if timer services are requested. Must be word #8 if timer services are requested.)

# DIT FOR FIXED HEAD DISK

|    | 0                                       | 1 | 2   | 3   | 4 | 5 | 6 | 7   | 8     | 9 | 10 | 11 | 12             | 15              |           |
|----|-----------------------------------------|---|-----|-----|---|---|---|-----|-------|---|----|----|----------------|-----------------|-----------|
|    | 0                                       | 1 | ACT | REQ | 0 | 0 | 0 | I/O | IAK   | 0 | 0  | 0  | STATE          |                 | DFLAG     |
| 1  | NEXT DITP                               |   |     |     |   |   |   |     |       |   |    |    |                |                 | DLINK     |
| 2  | CURRENT REQUEST SYSBASE INDEX           |   |     |     |   |   |   |     |       |   |    |    |                |                 | DCURRREQP |
| 3  | IOT                                     |   |     |     |   |   |   |     | LDEVN |   |    |    |                |                 | DLDEV     |
| 4  | DLTP                                    |   |     |     |   |   |   |     |       |   |    |    |                |                 | DDLTP     |
| 5  | ILTP                                    |   |     |     |   |   |   |     |       |   |    |    |                |                 | DILTP     |
| 6  | DEVICE STATUS                           |   |     |     |   |   |   |     |       |   |    |    |                |                 | DSTAT     |
| 7  | DEVICE STATUS (ERROR)                   |   |     |     |   |   |   |     |       |   |    |    |                |                 | DSERR     |
| 8  | SYSBASE INDEX OF FIRST REQUEST IN QUEUE |   |     |     |   |   |   |     |       |   |    |    |                |                 | DQHEAD    |
| 9  | SYSBASE INDEX OF LAST REQUEST IN QUEUE  |   |     |     |   |   |   |     |       |   |    |    |                |                 | DQTAIL    |
| 10 | XFER COUNT                              |   |     |     |   |   |   |     |       |   |    |    |                |                 | DXFER     |
| 11 | LOGICAL DISK ADDR                       |   |     |     |   |   |   |     |       |   |    |    |                |                 | DDADR     |
| 12 | SYSBUF ADDRESS                          |   |     |     |   |   |   |     |       |   |    |    |                |                 | DSYSBA    |
|    | ERROR & RETRY INFORMATION               |   |     |     |   |   |   |     |       |   |    |    |                |                 |           |
|    | B                                       | W |     |     |   |   |   |     |       |   |    |    | RETRY<br>COUNT | QMISC<br>OF IOQ |           |

IOT - I/O Devices

0 - Series II/III

1 - HP-IB

3 - unused

4 - unused

B - modify bad track table

W - write bad track table

# DIT FOR 7900A & 2888A MOVING HEAD DISC

|    | 0                                       | 1 | 2   | 3   | 4 | 5    | 6 | 7    | 8   | 9 | 10 | 11 | 12    |  | 15 |          |
|----|-----------------------------------------|---|-----|-----|---|------|---|------|-----|---|----|----|-------|--|----|----------|
|    | 0                                       | 1 | ACT | REQ | 0 | M    | 0 | I/O  | IAK | 1 | 0  | 0  | STATE |  |    | DFLAG    |
|    |                                         |   |     |     |   | UNIT |   | PROG |     |   |    |    |       |  |    |          |
| 1  | NEXT DITP                               |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DLINK    |
| 2  | CURRENT REQUEST SYSBASE INDEX           |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DCURREQP |
| 3  | IOT                                     |   |     |     |   | UNIT |   |      |     |   |    |    | LDEVN |  |    | DLDEV    |
| 4  | DLTP                                    |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DDLTP    |
| 5  | ILTP                                    |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DILTP    |
| 6  | CURRENT DEVICE STATUS                   |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DSTAT    |
| 7  | DEVICE ERROR STATUS                     |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DSERR    |
| 8  | SYSBASE INDEX OF FIRST REQUEST IN QUEUE |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DQHEAD   |
| 9  | SYSBASE INDEX OF LAST REQUEST IN QUEUE  |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DQTAIL   |
| 10 | CURRENT DISC                            |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DADR     |
| 11 | ADDRESS                                 |   |     |     |   |      |   |      |     |   |    |    |       |  |    |          |
| 12 | ALTERNATE TRACK                         |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DALTADR  |
| 13 | DISC ADDRESS                            |   |     |     |   |      |   |      |     |   |    |    |       |  |    |          |
| 14 | CURRENT CYLINDER                        |   |     |     |   |      |   |      |     |   |    |    |       |  |    | CURCYL   |
| 15 | CURRENT DATA BUFFER ADDRESS             |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DBUFF    |
| 16 | NEXT DATA BUFFER ADDRESS                |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DNXTBUFF |
| 17 | WORD COUNT REMAINING                    |   |     |     |   |      |   |      |     |   |    |    |       |  |    | WCR      |
| 18 | CURRENT WORD COUNT                      |   |     |     |   |      |   |      |     |   |    |    |       |  |    | CWC      |
| 19 | SYSBUF ADDRESS                          |   |     |     |   |      |   |      |     |   |    |    |       |  |    | DSYSBA   |

IOT - I/O Devices

- 0 - Series II/III
- 1 - HP-IB
- 3 - unused
- 4 - unused

| ERROR & RETRY INFORMATION |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0                         | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  |
| ---                       | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|                           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| M                         | R   | W   | T   | A   | X   | C   | S   | 0   | 0   | 0   | 0   |     |     |     |     |
| ---                       | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

RETRY  
COUNT

QMISC OF IOQ

M - handling defective track map  
R - read defective track map  
W - write defective track map  
T - track to track xfer

A - reading alternate track  
X - xfer from alt. track  
C - recalibration done  
S - seek or recal in progress

|    | 0                                       | 1 | 2   | 3   | 4    | 5 | 6 | 7    | 8   | 9 | 10 | 11 | 12    | 15 |           |
|----|-----------------------------------------|---|-----|-----|------|---|---|------|-----|---|----|----|-------|----|-----------|
| 0  | 0                                       | 1 | ACT | REQ | 0    | M | 0 | I/O  | IAK | 1 | 0  | 0  | STATE | 0  | DFLAG     |
|    |                                         |   |     |     | UNIT |   |   | PROG |     |   |    |    |       |    |           |
| 1  | NEXT DITP                               |   |     |     |      |   |   |      |     |   |    |    |       | 1  | DLINK     |
| 2  | CURRENT REQUEST SYSBASE INDEX           |   |     |     |      |   |   |      |     |   |    |    |       |    | DCURRREQP |
| 3  | IOT                                     |   |     |     | UNIT |   |   |      |     |   |    |    | LDEVN | 3  | DLDEV     |
| 4  | DLTP                                    |   |     |     |      |   |   |      |     |   |    |    |       | 4  | DDLTP     |
| 5  | ILTP                                    |   |     |     |      |   |   |      |     |   |    |    |       | 5  | DILTP     |
| 6  | CURRENT DEVICE STATUS                   |   |     |     |      |   |   |      |     |   |    |    |       | 6  | DSTAT     |
| 7  | ERROR DEVICE STATUS                     |   |     |     |      |   |   |      |     |   |    |    |       | 7  | DSERR     |
| 8  | SYSBASE INDEX OF FIRST REQUEST IN QUEUE |   |     |     |      |   |   |      |     |   |    |    |       |    | DQHEAD    |
| 9  | SYSBASE INDEX OF LAST REQUEST IN QUEUE  |   |     |     |      |   |   |      |     |   |    |    |       |    | DQTAIL    |
| 10 | CURRENT LOGICAL                         |   |     |     |      |   |   |      |     |   |    |    |       | 12 |           |
| 11 | DISK ADDRESS                            |   |     |     |      |   |   |      |     |   |    |    |       | 13 | CLDA      |
| 12 | CURRENT PHYSICAL                        |   |     |     |      |   |   |      |     |   |    |    |       | 14 | CURCUL    |
| 13 | DISK ADDRESS                            |   |     |     |      |   |   |      |     |   |    |    |       | 15 | CPDA      |
| 14 | CURRENT DATA BUFFER ADDRESS             |   |     |     |      |   |   |      |     |   |    |    |       | 16 | CDBA      |
| 15 | WORD COUNT REMAINING                    |   |     |     |      |   |   |      |     |   |    |    |       | 17 | WCR       |
| 16 | CURRENT WORD COUNT                      |   |     |     |      |   |   |      |     |   |    |    |       | 20 | CWC       |
| 17 | SYSBUF ADDRESS                          |   |     |     |      |   |   |      |     |   |    |    |       | 21 | SYSBUFA   |
| 18 | STATUS 1 RETURN                         |   |     |     |      |   |   |      |     |   |    |    |       | 22 | STAT1     |
| 19 | STATUS 2 RETURN                         |   |     |     |      |   |   |      |     |   |    |    |       | 23 | STAT2     |
| 20 |                                         |   |     |     |      |   |   |      |     |   |    |    |       | 24 |           |
| 21 | CYL                                     |   |     |     |      |   |   |      |     |   |    |    |       | 25 | CEDA      |
| 22 | HEAD                                    |   |     |     |      |   |   |      |     |   |    |    |       | 26 |           |
| 23 | SECTOR                                  |   |     |     |      |   |   |      |     |   |    |    |       | 27 |           |
| 24 | STATUS 1 RETURN                         |   |     |     |      |   |   |      |     |   |    |    |       | 27 |           |
| 24 | CYL                                     |   |     |     |      |   |   |      |     |   |    |    |       | 30 |           |

|    |                                    |        |    |                     |
|----|------------------------------------|--------|----|---------------------|
| 25 | HEAD                               | SECTOR | 31 | REQUEST<br>SYNDROME |
| 26 | DISPLACEMENT                       |        | 32 |                     |
| 27 | PATT 1                             |        | 33 |                     |
| 28 | PATT 2                             |        | 34 |                     |
| 29 | PATT 3                             |        | 35 |                     |
| 30 | SCOUNT (SECTOR COUNT)              |        | 36 |                     |
| 31 | INITIALIZE ADDRESS                 |        | 37 |                     |
| 32 |                                    |        | 38 |                     |
| 33 | POINTER TO THIS DIT'S STATTAB WORD |        | 39 |                     |

## IOT - I/O Devices

0 - Series II/III

1 - HP-IB

3 - unused

4 - unused

## ERROR &amp; RETRY INFORMATION

|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| D | S | E | M | W | O | O | C | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  |
|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

QMISC OF IOQ

D - retry determination

S - request syndrome

E - request error info

M - update track map

W - writing track map

C - issued a recalibration

# DIT FOR 7970 MAG TAPE

|    | 0                   | 1  | 2   | 3   | 4    | 5 | 6    | 7   | 8   | 9 | 10 | 11     | 12    | 15 |         |
|----|---------------------|----|-----|-----|------|---|------|-----|-----|---|----|--------|-------|----|---------|
|    | 0                   | 0  | ACT | REQ | 0    | M | 0    | I/O | IAK | 0 | 0  | 0      | STATE |    | DFLAG   |
|    |                     |    |     |     | UNIT |   | PROG |     |     |   |    |        |       |    |         |
| 1  | NEXT DITP           |    |     |     |      |   |      |     |     |   |    |        |       |    | DLINK   |
| 2  | IOQP                |    |     |     |      |   |      |     |     |   |    |        |       |    | DIOQP   |
| 3  | IOT                 |    |     |     | UNIT |   |      |     |     |   |    | LDEV # |       |    | DLDEV   |
| 4  | DLT PTR             |    |     |     |      |   |      |     |     |   |    |        |       |    | DDLTP   |
| 5  | ILT PTR             |    |     |     |      |   |      |     |     |   |    |        |       |    | DILTP   |
| 6  | RW                  | RU | SH  | CE  | DC   |   |      |     |     |   |    |        |       |    | DSTAT   |
| 7  | ERROR STATUS        |    |     |     |      |   |      |     |     |   |    |        |       |    | DSERR   |
| 8  | TIMEOUT FLAGS       |    |     |     |      |   |      |     |     |   |    |        |       |    | DTIME   |
| 9  |                     |    |     |     |      |   |      |     |     |   |    | 13     | RB4   | RW | DDFLAGS |
| 10 | TIMER REQUEST INDEX |    |     |     |      |   |      |     |     |   |    |        |       |    | DTRLX   |

IOT - I/O Devices

- 0 - Series II/III
- 1 - HP-IB
- 3 - unused
- 4 - unused

DSAVE - Device processing flags

RW RWBIT - Indicates tape has been rewound.

RU RWUNLD - Indicates that a rewind/unload was performed to allow a write-ring mount.

SH SHORT - A short read is in progress. After completion of read, EOF is checked for and if not present, the requested bytes are transferred from the short-read buffer to the user's buffer.

CE CESTAT - Channel parity error processing is in progress.

DC DSFLAG - Transfer used data chaining - used for computing the transmission log.

RW - (DDFLAGS, bit 15) if set, tape is rewound

RB4 - (bit 14) if set, need to rewind tape before next write



| QMISC |    |    |    |    |    |    |         |         |    |         |    |    |    |    |    |
|-------|----|----|----|----|----|----|---------|---------|----|---------|----|----|----|----|----|
| 0     | 1  | 2  | 3  | 4  | 5  | 6  | 7       | 8       | 9  | 10      | 11 | 12 | 13 | 14 | 15 |
| --    | -- | -- | -- | -- | -- | -- | --      | --      | -- | --      | -- | -- | -- | -- | -- |
|       |    |    |    |    |    |    | FORWARD | BACK    |    |         |    |    |    |    |    |
| R     | B  | F  | G  | E  | S  | U  | SPACE   | SPACE   |    | RETRY   |    |    |    |    |    |
|       |    |    |    |    |    |    | COUNTER | COUNTER |    | COUNTER |    |    |    |    |    |
| --    | -- | -- | -- | -- | -- | -- | -----   | -----   |    | -----   |    |    |    |    |    |

Where

- R - retry in progress
- B - backspace in progress
- F - forward space in progress
- G - gap in progress
- E - backspace on data end-of-file
- S - short read in progress
- U - unload tape for write ring installation

## DIT for 7976 Magnetic Tape

There is one DIT per physical device. If a physical device represents more than one logical device, the logical device number is obtained from the IOQ element. The following diagram shows the DIT used for the mag tape driver.

| 0                                                                                                 | 1                                                                                                                                    | 2  | 3            | 4  | 5  | 6  | 7                     | 8  | 9  | 10 | 11 | 12 | 13    | 14 | 15    | MNEMONIC  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----|--------------|----|----|----|-----------------------|----|----|----|----|----|-------|----|-------|-----------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 0                                                                                                 | 0                                                                                                                                    | 0  | AC           | RQ | 0  | MU | 0                     | IO | IA | 0  | 0  | 0  | STATE |    |       | DFLAG     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 1                                                                                                 | SYSDB relative pointer to the DIT for the next device requesting this resource or service                                            |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DLINK     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 2                                                                                                 | SYSDB relative pointer to the first IOQ in request list for this device                                                              |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DIOQP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 3                                                                                                 |                                                                                                                                      |    | Phys. unit # |    |    |    | Logical device number |    |    |    |    |    |       |    | DLDEV |           |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 4                                                                                                 | SYSDB relative pointer to Device Linkage Table                                                                                       |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DDLTP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 5                                                                                                 | SYSDB relative pntr to Interrupt Linkage Table                                                                                       |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DILTP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 6                                                                                                 | RW                                                                                                                                   | RU | SH           |    | DC | PF |                       |    |    |    |    |    |       |    |       | DSAVE     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| 7                                                                                                 | Hardware error status. Set when the driver detects an error. Whenever <>0, the driver monitor logs an I/O error and clears this word |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DSERR     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| %10                                                                                               | Bit 0 is set at completion of timer                                                                                                  |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DTIME     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| %11                                                                                               | Interrupt status for this unit. Set by the driver each time it processes an interrupt.                                               |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DSTAT     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| %12                                                                                               | Holds the time out request entry index while a timer is active.                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DRQST     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |
| %13                                                                                               | Error log. Contains 5 valid bytes of status                                                                                          |    |              |    |    |    |                       |    |    |    |    |    |       |    |       | DLOGERROR |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |    |    |                       |    |    |    |    |    |       |    |       |           |

### DFLAG - Flags and request state

- AC ACTIVE - A monitor is currently servicing this device.
- RQ REQUEST - A service request is pending while the monitor is active.
- MU MUNIT - This device is on a multi-unit controller.
- IO IOPROG - An I/O Channel Program is running for this device.
- IA IAK - An interrupt or response has occurred for this device.
- NO NOTRDY - Go to state %10 after Idle Channel Program is started.
- ST STWAIT - The device monitor is starting an Idle Channel Program for this device. There is no IOQ associated with this type of request.

STATE - State of the device monitor. Specifies the next action to be taken in SIODM in servicing the request:

- 0 - start new request
- 1 - not used
- 2 - call driver initiator procedure
- 3 - call driver completor procedure
- 4 - not used
- 5 - process request completed
- 6 - initiate device recognition sequence
- 7 - start operator intervention wait
- %10 - wait for interrupt (operator intervention)  
restart at state 0
- %11 - wait for data segment freeze, then state 2
- %12 - wait for driver initiator to be frozen, then  
allocate controller (state 2)
- %13 - wait for I/O completion interrupt, then state 3
- %14 - wait for controller, then call driver initiator
- %15 - not used
- %16 - wait for initiator make present, then state 2
- %17 - wait for completor make present, then state 3

DSAVE - Device processing flags

RW RWBIT - Indicates tape has been rewound.

RU RWUNLD - Indicates that a rewind/unload was performed to allow a write-ring mount.

SH SHORT - A short read is in progress. After completion of read, EOF is checked for and if not present, the requested bytes are transferred from the short-read buffer to the user's buffer.

DC DSFLAG - Transfer used data chaining - used for computing the transmission log.

PF POWER - Device power up indication.

DSTAT - Mag tape controller status

| BITS | USE                                             |
|------|-------------------------------------------------|
| 0    | END OF FILE (EOF)                               |
| 1    | BEGINNING OF TAPE (BOT) / LOAD POINT (LP)       |
| 2    | END OF TAPE (EOT)                               |
| 3    | SINGLE TRACK ERROR (NOT LOGGED FOR READS)       |
| 4    | COMMAND REJECT (REJECT)                         |
| 5    | FILE PROTECT (NOT WRITE ENABLED; NO WRITE RING) |
| 6    | MULTIPLE TRACK ERROR (MTE)                      |
| 7    | UNIT ONLINE                                     |
| 8    | GCR (6250 BPI DENSITY)                          |
| 9    | UNIT NUMBER (MSB)                               |
| 10   | UNIT NUMBER (LSB)                               |
| 11   | TIMING ERROR                                    |
| 12   | TAPE RUNAWAY                                    |
| 13   | REWINDING *                                     |
| 14   | UNIT BUSY ** (REPORTED AS UNIT NOT READY)       |
| 15   | INTERFACE BUSY *                                |

-----  
 TERMINAL DIT  
 -----

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

-----  
 DFLAG FOR A READ:  
 -----

|   |     |    |     |     |     |     |     |    |     |     |     |     |        |  |  |
|---|-----|----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|--------|--|--|
| 0 | TRM | UP | ACT | REQ | SIH | SPG | WWT | PR | NWL | PTY | TCH | BRD | DSTATE |  |  |
|---|-----|----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|--------|--|--|

-----  
 DFLAG FOR A WRITE:  
 -----

|   |     |    |     |     |     |     |   |     |     |        |  |  |  |  |  |
|---|-----|----|-----|-----|-----|-----|---|-----|-----|--------|--|--|--|--|--|
| 0 | TRM | UP | ACT | REQ | SIH | WWT | 1 | NWL | AWT | DSTATE |  |  |  |  |  |
|---|-----|----|-----|-----|-----|-----|---|-----|-----|--------|--|--|--|--|--|

|     |                                                                |       |         |      |         |     |           |                  |             |     |          |         |       |       |       |       |
|-----|----------------------------------------------------------------|-------|---------|------|---------|-----|-----------|------------------|-------------|-----|----------|---------|-------|-------|-------|-------|
| 1   | SYS I/O PROC NEXT DIT POINTER                                  |       |         |      |         |     |           |                  |             |     |          |         | DLINK |       |       |       |
| 2   | FIRST REQUEST IOQ POINTER                                      |       |         |      |         |     |           |                  |             |     |          |         | DIOQP |       |       |       |
| 3   | FLU                                                            | NCE   | NPT     | UNIT |         |     |           | LOGICAL DEVICE # |             |     |          |         | DLDEV |       |       |       |
| 4   | DLT POINTER                                                    |       |         |      |         |     |           |                  |             |     |          |         | DDLTP |       |       |       |
| 5   | ILT POINTER                                                    |       |         |      |         |     |           |                  |             |     |          |         | DILTP |       |       |       |
| 6   | HGU                                                            | DSC   | CFT     | TTO  | HTO     | SPE | SPW       | RDT              | ONL         | DSY | LGO      | BRK     | ESC   | BTO   | STD   | DRQST |
| 7   | TIM                                                            | TMR   | DELECHO | FFD  | TTYTYPE |     |           |                  | EXS         | CNP | PAIRCODE |         |       | DTYPE |       |       |
| %10 | PEM                                                            | MTYPE |         | CF   | CB      | SB  | NSY       | RCT              | WCT         | PMD | TMODE    | LPLEVEL |       | DMODE |       |       |
| 11  | TPM                                                            | RES   | SYN     | ECH  | SPS     | ESC | OUTSPEED  |                  |             | FIL | BOK      | INSPEED |       | DSPEE |       |       |
| 12  | 0                                                              | 0     | UNIT    |      |         |     | PCL       | PTY              | NEXT DSTATE |     |          | PSL     | 1     | 0     | DCNTR |       |
| 13  | REQUESTED COUNT IN BYTES                                       |       |         |      |         |     |           |                  |             |     |          |         | DRBC  |       |       |       |
| 14  | READ/WRITE BYTE COUNT                                          |       |         |      |         |     |           |                  |             |     |          |         | DBCNT |       |       |       |
| 15  | WAITED STATE                                                   |       | HSTATE  |      | TTW     |     | TURN CHAR |                  |             |     |          | DSAVE   |       |       |       |       |
| 16  | SUB SYS BREAK CHAR                                             |       |         |      |         |     | EOR CHAR  |                  |             |     |          |         | DSTOP |       |       |       |
| 17  | NEXT DITP OF BANDWIDTH WAITED DEVICE                           |       |         |      |         |     |           |                  |             |     |          |         | DWAIT |       |       |       |
| %20 | WRITE BYTES TANKED SO FAR / TIMEOUT LENGTH FOR BLOCK MODE READ |       |         |      |         |     |           |                  |             |     |          |         | DXCNT |       |       |       |
| 21  | BYTE COUNT OF EOF SAVED READ                                   |       |         |      |         |     |           |                  |             |     |          |         | DBTI  |       |       |       |
| 22  | COUNT TO END OF READ/WRITE TBUF                                |       |         |      |         |     |           |                  |             |     |          |         | DCNT  |       |       |       |
| 23  | HEAD POINTER TO READ/WRITE TBUF's                              |       |         |      |         |     |           |                  |             |     |          |         | DHEAD |       |       |       |
| 24  | TAIL POINTER TO READ/WRITE TBUF's                              |       |         |      |         |     |           |                  |             |     |          |         | DTAIL |       |       |       |

|     |                                               |               |
|-----|-----------------------------------------------|---------------|
| 25  | BYTE POINTER TO NEXT READ/WRITE BYTE          | DPNTR         |
| 26  | HEAD POINTER TO EOF SAVED READ TBUF's         | DRPTR         |
| 27  | TERMINAL TYPE   BWR   PTY SV     NFM   DSPEED | DLAST         |
| %30 | POINTER TO NEXT DIT IN TBUF WAIT LIST         | DTBLK         |
| 31  | POINTER TO SAVED TBUF AFTER TBUF WAIT         | DNXTB         |
| 32  | READ TIME/FIRST WORD OF DOUBLE TIMERS         | DRTIM<br>DRTI |
| 33  | 2ND WORD OF DOUBLE READ START TIMER READING   |               |
| 34  | MAXIMUM READ TIME IN SECONDS                  | DRIMA         |
| 35  | LF SYNCS   CR SYNCS   SYNC COUNT              | DSYNC         |
| 36  | IOQP TO BROKEN READ SAVED DATE                | DBREA         |
| 37  | 2640/SPEED TRLX   LOGON/HANGUP/READ TRLX      | DTRLX         |
| %40 | CFAIL TRLX   TURN TRLX                        | DDSET         |
| 41  | LOGONTY XOW AEJ  CFAIL CNT   MCODE            | DMONI         |
| 42  | MMSTAT TIMING INFO                            | DMMTI         |
| 43  |                                               |               |
| 44  | RQS  ESCSEQCNT                                | DMISC         |

## TERMINAL DIT FIELDS AND DEFINITIONS

### DFLAG - FLAGS AND DEVICE STATE

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TERMINAL                 | Device is a terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| UP                       | If set, device is on line, has been speed sensed or has been initialized and can do I/O. If clear then in speed sense mode.                                                                                                                                                                                                                                                                                                                                         |
| ACTIVE                   | If set, monitor is currently active servicing this device.                                                                                                                                                                                                                                                                                                                                                                                                          |
| REQUEST                  | Service for this device was requested while the monitor was active.                                                                                                                                                                                                                                                                                                                                                                                                 |
| SPECIH                   | Use special interrupt handler.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| SPOOLING                 | Input has been requested through the PTAPE procedure.                                                                                                                                                                                                                                                                                                                                                                                                               |
| WRTWAIT                  | A character or sync is in the process of being output and a completion interrupt is expected.                                                                                                                                                                                                                                                                                                                                                                       |
| PAIR                     | Pair is set whenever no read is in progress or when the action on the next character is dependent on the previous character input or the previous state. See paircode for details on the various pair conditions.                                                                                                                                                                                                                                                   |
| NEWLINE                  | A linefeed was the last character input or output. Used to determine if a CR/LF is necessary on mode changes or at FOPEN time.                                                                                                                                                                                                                                                                                                                                      |
| PTYCHK/<br>2645K<br>FLAG | Read data is to be checked for correct parity, and if incorrect a parity error indication is to be returned to the caller.                                                                                                                                                                                                                                                                                                                                          |
| TERMCHAR                 | A special read termination character has been specified. The read data is to be checked and if the termination character is found the read will be terminated and the character set in the buffer. If the binaryread bit is set then this bit indicates a "transparent" read is in progress with sub system break and EOR characters in DSTOP. Both a termchar and a transparent read may be in progress simultaneously if the termchar field of QPAR2 is not zero. |

## TERMINAL DIT (CONT.)

-----

**BINARYREAD** A binary or transparent read was specified. If TERMCHAR is clear then a binary read is in progress. All 8 bits are transferred and no editing takes place. A binary read is terminated only when the count is satisfied. If termchar is set, then a transparent read is in progress. No editing takes place but only 7 bits are transferred. An EOR and sub system break character are held in DSTOP.

**ACKWAIT** An ENQ was sent to a 2640/44. Waiting for an ack or time out before continuing the write. Has this meaning during write operations only.

**DSTATE** Device state. Specifies the current device activity and is used to determine the next state.

- 0 - null or no activity.
- 1 - writing.
- 2 - reading.
- 3 - XON write, reading next.
- 4 - turning 202 modem to write state, next state in NXTD STATE.
- 5 - wait for less terminal activity to start read/write
- 6 - end of record (EOR) LF in progress, null state next.
- 7 - EOR CR in progress, EOR CR state next.
- %10 - EOR sync in progress, EOR CR state next.
- %11 - write being waited for a break allowed check by term.
- %12 - delete LF or delete echo character being written or start read next. Send XON to start read next.
- %13 - delete CR being written, delete LF state next.
- %14 - "!!!" or syncs being written. Next state is delete CR or saved in WAITEDSTATE if sync set.
- %15 - 1st character of a termtype 11 read is being echoed.
- %16 - have TIP start a read operation.
- %17 - finish up read then do DSTATE operation held in NXTDSTATE.

**DLINK** - Link word for linked list of the devices waiting for service  
----- by the system IO process. If not zero or -1 (end of list) then a DIT pointer to the next device waiting.

**DIOQP** - SYSDB relative pointer to the first IOQ element in the request  
----- list for this device.

**DLDEV** - Logical device number and unit number.  
-----

**FLUSH** This flag is set whenever a break has been detected and accepted. While it is set, writes are returned completed without any I/O being done. Reads are returned with an unusual condition status, %173. It also holds off any further break service requests. It is reset with a function code 25 operation.



TERMINAL DIT (CONT.)

-----  
NO'CX'ECHO     if set, then "!!!" is not to be echoed when a control  
                 X is detected to delete a line.

.NO PTY        Termttype is 8 bit in nature.(no pty set or check allowed)

UNIT           unit number of device.

LDEVN          Logical device number.

DDLTP - SYSDB relative pointer to driver linkage table (DLT).  
-----

DILTP - SYSDB relative pointer to interrupt linkage table (ILT).  
-----

DRQST - Monitor service request flags. The requests are serviced in  
----- a left to right order. The bit position determines the  
                 priority with which the request is serviced.

HANGUPTO       Hangup timeout has been completed.

DISCNCT        Dataset has disconnected (dataset ready has dropped).

CFAILTO        Timeout started when carrier failed has completed. If  
                 103 then hangup else try to turn 202 around again.

TURNT0         CB or SB is not true 5 seconds after starting the read  
                 to write turnaround on the 202. Hangup device.

HP2640TO       An ACKWAIT from an ENQ to 2640/44 has timed out. The  
                 ACKWAIT is terminated and the write restarted.

SPOOLEND        A control Y has been detected terminating PTAPE input.

SPOOLSW        Switch PTAPE input buffers.

READTO         A read operation has been timed out.

ONLINE          A colon has been input and the device speed sensed. If  
                 not connected through a dataset, initiate a log on time  
                 out.

DSETRDY        Dataset ready has been detected.     Initiate a log on  
                 time out.

LOGONTO        A log on time out has occurred. The caller has not  
                 logged on. The device is hungup.

BRK            A break has been detected or SB has dropped while writing.

# TERMINAL DIT (CONT.)

-----

ESC            A control Y has been detected.

BLOCK TO      Block mode read has timed out before completion. Read is returned with IO timeout code.

STAT DONE     Logical write and associated status request have been completed for 2631B.

DTYPE - Terminal type and other flags.

-----

TIMING        A request to measure the time taken to complete a read operation has occurred and the time at the initiation of the read has been saved in DRTIMED. When the read is completed, the time taken will be saved in DRTIME.

TIMEREAD      The time required to complete a read operation is to be monitored and saved in DRTIME.

DELECHO       This field contains a code which specifies the character to be output when a delete character (control H) is input. Different characters are output if the word count is zero to keep the carriage at the proper place.

| CODE | INPUT<>0  | INPUT=0 | COMMENT                   |
|------|-----------|---------|---------------------------|
| 0    | nothing   | space   | terminal backspaces       |
| 1    | "/"       | nothing | hard copy no backspace    |
| 2    | line feed | space   | hard copy backspaces      |
| 3    | control Y | nothing | 2600 control Y backspaces |

FORMFEED      If set then a form feed is output when the form feed character (%14) is to be output. If clear a LF is output in place of the form feed character. In either case, the character is preceded by an XOFF and carriage return. Usually clear for terminals which do not respond to a form feed.

TTYTYPE       terminal type as specified in the MPE ERS.

|                      |                                                            |
|----------------------|------------------------------------------------------------|
| 0 - ASR 33           | 9 - mini bee (HP2615)                                      |
| 1 - ASR 35           | 10 - HP2640/44                                             |
| 2 - ASR 37           | 11 - HP2640/44 & auto enter cap                            |
| 3 - execuport        | 12 - HP2645K Katakana/Roman data                           |
| 4 - datapoint        | 13 - term connected to switching network or other computer |
| 5 - Memorex          | 14 - Multipoint terminal                                   |
| 6 - terminet         | 15 - HP2635A print term (8 bit)                            |
| 7 - 2741 call 360    | 16 - HP2635A print term (7 bit)                            |
| 8 - 2741 PTTC/EBCDIC |                                                            |

# TERMINAL DIT (CONT.)

-----

**ETXSENT**           End of Text (ETX) character has been sent to a 2640X on a 202 to stop the terminal from listening. Carrier may now be dropped.

**CONSTRNTRPT.**(11:1) If set then Control A on the Console will cause PROGEN to be awoken. If clear, then Control A is ignored.

**PAIRCODE**       when the action to be taken on the next character is dependant on the previous state or character input then this field contains a code specifying the previous character or condition.

- 0 - no read in progress
- 1 - XOFFPAIR. Last character input was an XOFF during a tapemode read on a terminet. EOR has been returned and if the next char is a CR then ignore it.
- 2 - DELETEPAIR. A LF was echoed on a char delete. No LF echo is needed if next char is a control H.
- 3 - ESCPAIR. Last character was an escape. Check next character for an escape sequence.
- 4 - NODATAYET. A "NONSYNCR" terminal read has been started with echo on but no data has been input yet. If the first character is a DC2 then paircode is set to enter (the DC2 is not saved) otherwise process as a regular character.
- 5 - NOECHO. A termtype 11 read has been started with echo off. If first char is a DC2 then set paircode to enter (1st char not saved) otherwise write character.
- 6 - CRWAIT. A 2640/44 block mode read has been satisfied and stopped and waiting for a CR to complete the read. No Control X checks are made to restart read.
- 7 - CRWAITLF. Same as CRWAIT but an LF is to be echoed if requested after the CR is detected. Continue read with echo on.
- 8 - ENTER. First character of a noecho read was a DC2. If next character not a CR then set Data Lost status, else set PRIMED and if Reading then restart read to input data.
- 9 - DC2PAIR. Last character read was a DC2 from a 2640/44. If the next character is a CR then set primed, delete all data input and restart read.

# TERMINAL DIT (CONT.)

## DMODEM - Modem state and control flags

|            |                                                                                                                                                                                                                                                                                                                    |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PREMPT     | When set indicates that at least one request is preemptive. In this case a scan of the request list is made to determine which request should be processed first and if the current request is to be stopped.                                                                                                      |
| MTYPE      | Modem Type<br>0 - hardwired            2 - 202S<br>1 - 103                   3 - 2002<br>4-7 -- Same as 0-3 except no speed sensing is done.                                                                                                                                                                       |
| CF         | Carrier detected status from dataset.                                                                                                                                                                                                                                                                              |
| CB         | Clear to send status from dataset. Request to send delayed.                                                                                                                                                                                                                                                        |
| SB         | Secondary receive status. Senders CB when writing.                                                                                                                                                                                                                                                                 |
| NOSYNC     | If set specifies that no delays are used by this terminal. Instead an ENQ is sent after 80 characters and the write doesn't continue until an ACK is received or a timeout occurs. Set for 2640/44 terminals.                                                                                                      |
| RDCOUNTED  | When set, indicates the "number of terminals doing block mode reads counter" has been incremented and when this operation completes the counter is to be decremented.                                                                                                                                              |
| WRTCOUNTED | When set, indicates that the "number of terminals doing writes" has been incremented and when this unit completes its operation the counter is to be decremented.                                                                                                                                                  |
| PRIMED     | When set indicates an "ESC D" sequence has been written or a DC2 has been received by a NOSYNC terminal. Before any read operation is initiated to a primed terminal to do a block mode read, the number of terminals doing I/O must be less than 13. If it is greater then a request to start the read is queued. |
| TMODE      | Terminal Mode.<br>0 - normal<br>1 - break mode<br>2 - console mode<br>3 - console mode and return to break mode                                                                                                                                                                                                    |
| LPLEVEL    | Preempt level of last request. If preempt level of new request is higher then generate a CR/LF.<br>0 - normal request<br>1 - Not Used<br>2 - normal request with terminal in console mode<br>3 - soft preempt (preempt reads with no input yet)<br>4 - hard preempt (preempt all requests)                         |

DSPEED - Multiplexor speed and other flags.

-----

TAPEMODE      Input from paper tape. No characters are emitted in response to delete commands or at end of record.

RESTART      If set indicates that a write completion interrupt has occurred while the terminal buffers were being filled. The filling procedure restarts the write by issuing a SYNC. During a read if this bit is set, the read is to be restarted when a CR is detected because a control X deleting the line was detected.

## TERMINAL DIT (CONT.)

-----

**SYNC** If set and DSTATE=Repeating then SCOUNT contains the number of SYNC characters to be output after the completion of the current operation. If clear and DSTATE=Repeating, then SCOUNT contains the number of "!" remaining to be output in response to a Control X.

**ECHO** If set specifies that characters read during input are to be echoed if the device is operating full duplex.

**SPDSENSING** If set indicates that the device is in the speed sensing mode. When in the speed sensing mode a control has been sent to the multiplexor connecting the main channel to the diagnostic channels.

**ESC** Control Y breaks have been enabled through an FCONTROL call.

**OUTSPEED** A code used to determine the baud rate and character size of the data output.

|                                     |            |
|-------------------------------------|------------|
| 0 - 240 CPS or not determined       | 4 - 30 CPS |
| 1 - 240 characters per second (CPS) | 5 - 15 CPS |
| 2 - 120 CPS                         | 6 - 10 CPS |
| 3 - 60 CPS                          | 7 - 14 CPS |

**FILLING** Set when IOTERMO is putting data into TBUFS. If the last TBUF is to be returned by TIP when this flag is set then the write is waited and DCNT is set to -2 by TIP to indicate TIP is waiting.

**BRKOK** If set then break is allowed otherwise break is ignored. Set and cleared through FCONTROL calls.

**INSPEED** A code used to determine the baud rate and character size to be used to input data. The codes have the same meaning as those specified in outspeed above.

**DCNTRL** - This is a control word output to the multiplexor board to  
-----  
send control and data to the particular channel. It also contains other information in the unused areas.

**PCL** - Parity Control bit. If set, parity is enabled. If it is zero, parity is disabled.

**PARITY** This bit is ORED into the eighth bit position on all characters output. If the eighth bit is zero it represents the parity of the character output if the parity control option is selected, otherwise it represents the sense of the eighth bit output. Also represents the parity expected during a read. Set when speed sensed or by function 21.

**NXTDSTATE** This is the next DSTATE to be set after a 202 modem turnaround is completed. Also contains the next DSTATE after a FINISHREAD (DSTATE=%17) operation is completed.

## TERMINAL DIT (CONT.)

-----  
**PRESPLAST**     If set then the last write operation was a PRESPLACE.  
                  If next write is a postspace and newline is not set then  
                  a CR/LF is output to clean up the carriage.

**DRBCT** - For read and write request, this word holds the requested  
-----  
                  transfer count in bytes.

**DEBCT** - During reads this word contains the number of characters input.  
-----  
                  During writes it contains the number of characters remaining  
                  to be written, including any already written from the current  
                  TBUF.

**DSAVE** - Holds next DSTATE after waiting and repeating DSTATEs and  
-----  
                  also the next byte to be output after a 202 turnaround is  
                  completed.

**WAITEDS**     Holds the current DSTATE when a break is detected and  
                  an operation is suspended in order that term may check  
                  that break is allowed. It also holds the next DSTATE  
                  after "SYNC's" are output in the repeating DSTATE.

**HSTATE**       Hangup state.  
                  0 - null or hungup  
                  1 - on line or normal operating condition  
                  2 - log on time out in progress  
                  3 & 5 - INITWAIT. speed sense failed, disconnected speed  
                  4 - DCLOSE issued, disconnect next.  
                  6 - hangup turn to read is in progress. the 202 dataset  
                        needed to be put in read state before hanging up.  
                  7 - hang up settling timeout is in progress.  
                        sensing delay, then reinitialize channel.

**TURN202**     If DSTATE is TURN202, then if set indicates a turn to  
                  write else the turn is a turn to read.

**TURNCHAR**     Holds the character to be output after the 202 is  
                  turned around from read to write.

**DSTOP** - Holds the subsystem break and end of record characters if not  
-----  
                  zero indicating no editing is to be applied to a read. If  
                  not zero then no editing is to be applied to the characters  
                  input except for the following characters.

**BREAKCHAR**     Detection of this character causes the same action as  
                  the detection of control Y for a normal read.

## TERMINAL DIT (CONT.)

- 
- EORCHAR**      Detection of this character terminates input. if the device is in tapemode or 264X doing block mode input, the read is not terminated until a CR is detected.
- DWAIT** - Link word for a linked list of the devices waiting to be  
-----  
started when the terminal activity decreases. If not zero then a DIT pointer of the next device waiting. If -1 then signifies that this device is the last one in the list.
- DXCNT** - Holds the number of bytes transferred so far to the TBUFs  
-----  
during a spacing or user's data transfer operation. Used to restart the TBUF fill operation after a wait because more than 270 bytes have already been tanked. (Valid for write.)
- DBTIME**- Contains the timeout length for block mode read. (Valid for  
-----  
read. This is the same word of the DIT as DXCNT.)
- DRCNT** - When read data has been saved because an EOF was returned this word contains the byte count of the saved data.
- DCNT** - During a write, this word contains the number of characters  
-----  
remaining to be written from the current TBUF. During a read it contains the number of characters remaining to fill the current TBUF or to satisfy the read count. Set to -2 to indicate a write completed during a fill operation. When -1 then new TBUF need to get next byte from.
- DHEAD** - A SYSDB relative pointer to the current TBUF being written  
-----  
from or the first TBUF of a linked list during a read.
- DTAIL** - A SYSDB relative pointer to the current TBUF being read  
-----  
into or the last TBUF of a linked list during a write.
- DPNTR** - A SYSDB relative byte index to the last byte written or  
-----  
to last byte read. During a read if a new buffer is to be gotten to save the current byte input then this pointer is set to -1.



DRPTR - When not zero, this word points to a linked list of TBUFs  
----- which contain the data saved from a read which returned an  
EOF requesting the read to be saved.

DLAST - Holds the default terminal type, parity save data and  
----- preconfigured speed code.

TERMT        Default terminal type. The terminal is set to this type  
              when it is speed sensed.

## TERMINAL DIT (CONT.)

-----

- BWRITE**            If set the last write was in binary mode and PTYSAVE contains the original parity control and sense bits.
- PTYSAVE**           Holds the PTYCNTRL and parity bits during a binary write when parity generation is disabled and the parity sense is set to zero.
- NEWFORM**           Last carriage control was a form feed.
- DSPEED**            Preconfigured default speed code. See OUTSPEED for definition.
- 
- DTBLK** - Link word for a linked list of the devices waiting for a TBUF  
----- to be available. If not zero or -1 (end of list) then a DITP pointer of the next device waiting.
- 
- DNXTB** - Holds the pointer to a TBUF allocated to a device which has  
----- been waiting. Used to insure that a waiting device gets at least one TBUF when it comes to the top of the TBUF waiting list.
- 
- 
- DRTIME**- During a times read, this is the reading of the timer at  
----- the initiation of the read. After a timed read is completed, the time in 1/100 of a second is saved in DRTIME as a single word. If it is -1 then the time was greater than 32K.
- DRIMAX**- When a read operation time out is requested, this quantity  
----- represents the maximum time in seconds allowed for the read to be completed.
- 
- 
- DSYNC** - CR and LF SYNC counts and the current SYNC count  
-----
- 
- 
- LFSYNC**            Contains the number of SYNCs to be issued after a carriage return is output. If >7, then actual count will be (N-6)\*5
- CRSYNC**            Contains the number of SYNCs to be issued after a carriage return is output. If >7, then actual count will be (N-6)\*5.

TERMINAL DIT (CONT.)

-----  
SCOUNT        SYNC COUNTER. Represents the number of SYNCs remaining to be issued after the current SYNC character is completed. This field also holds the number of "!"'s remaining to be echoed after a control X is input.

NOTE - Holds 80 minus the number of characters written since the last read or ENQ for 2640/44 terminals. When this count goes to zero, an ENQ is inserted in the write stream.

DBREAK- On broken reads, this word holds a pointer to an IOQ  
----- element which contains the count, head, tail and DPNTR pointers used to restart the broken read.

DTRLX - Holds read and data set time out request indexes.  
-----

2640TRLX     holds the timer request index for 2640/44 block mode reads and ENQ/ACK time outs.

READTRLX     holds logon, hangup and read time out request indexes.

DDSET - Holds the TRLX indexes for the timeouts associated with the  
----- data set control operations.

CFAILTRLX    Holds the TRLX index to time out loss of carrier detect

TURNTRLX     Holds the TRLX index to time out turn the 202 to write

DMONTR            Hold monitoring control code.

-----

.LOGONTYPE- indicates type of logon type to this terminal

0= :DATA

1= :JOB

2= :HELLO

.XONWAIT - XOFF has been received during write, waiting for XON to continue. This bit is set when a write is paused by a CONTROL S.

.AUTOEJECT- 2631B will skip over perforations.

.CFAILCNT - carrier fail detect count

.MCODE - Monitor function and control code.

.(13:5) - Function

0 - Null or no monitoring

1 - Call help

2 - Monitor activity

3 - Form Delta time histogram

7 - Monitor calls/counts/initiations

.(10:1) - Apply above to DSET1,DSET2 and DSETCONTROL

.(11:1) - Apply above to TIP

.(12:1) - Apply above to TERM

DMMTIM - 2 words used for timing statistics

-----

# TERMINAL DIT (CONT.)

-----  
DMISC - miscellaneous bit fields:  
-----

.REQSTAT - requesting 2631B status

.ESCSEQCNT- index into escape sequence for 2631B and VIEW

During PTAPE reads, several of the DITP words are used for different purposes than those in a normal read. The words and their use are listed below.

DBCNT - A 16 bit logical quantity representing the total number of characters input during this PTAPE read.

DCNT - SYSDB relative pointer to the base of the SBUF currently being used to hold the data as it is input.

DHEAD - SYSDB relative pointer to the base of the SBUF to be written to virtual, memory or the pointer to the buffer to be used when the current one is full.

DTAIL/

DPNTR- Double word logical disc address to the area where the next SBUF is to be written in virtual memory when it is full or the PTAPE read is terminated.

# TERMINAL DIT (CONT.)

## TERMINAL SPEED ENCODING

The default speed code set in the DIT will be used to initialize both the input and output speeds. This parameter will be used to determine the speed when an FCONTROL 37 (Allocate Terminal) is issued which does not specify a speed.

| CODE (Future rel) | SPEED (Baud)                  | CODE (SERIES II/III) |
|-------------------|-------------------------------|----------------------|
| 0                 | Undefined                     | 0                    |
| 1                 | Externally Clocked            |                      |
| 2                 | 50                            |                      |
| 3                 | 75                            |                      |
| 4                 | 110                           | 6                    |
| 5                 | 134.5                         | 7                    |
| 6                 | 150                           | 5                    |
| 7                 | 200                           |                      |
| 8                 | 300                           | 4                    |
| 9                 | 600                           | 3                    |
| 10                | 1200                          | 2                    |
| 11                | 4800                          | 1                    |
| 13                | 7200                          |                      |
| 14                | 9600                          |                      |
| 15-63             | Reserved for future expansion |                      |

The default speed code will be set in word %27 bits 10 thru 15 of the terminal DIT.

|     |                                                                    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
|-----|--------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|--|
|     | 0                                                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |  |
| %27 | Terminal Type   BWT   PTYSV   ///   NFM   DEFAULT SPEED   23 DLAST |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |

# CARD READER DIT

|     | 0                               | 1 | 2   | 3   | 4 | 5 | 6 | 7    | 8                | 9    | 10  | 11 | 12     | 15 |       |       |
|-----|---------------------------------|---|-----|-----|---|---|---|------|------------------|------|-----|----|--------|----|-------|-------|
|     | 0                               | 0 | ACT | REQ | 0 | 0 |   | I/O  | IAK              | READ | NR  |    | MSTATE |    | DFLAG |       |
|     |                                 |   |     |     |   |   |   | PROG |                  | DONE | MSG |    |        |    |       |       |
| 1   | DITP LINK TO NEXT DIT           |   |     |     |   |   |   |      |                  |      |     |    |        |    | DLINK |       |
| 2   | IOQP POINTER TO 1st REQUEST     |   |     |     |   |   |   |      |                  |      |     |    |        |    | DIOQP |       |
| 3   | UNIT #                          |   |     |     |   |   |   |      | LOGICAL DEVICE # |      |     |    |        |    |       | DLDEV |
| 4   | DRIVER LINKAGE TABLE POINTER    |   |     |     |   |   |   |      |                  |      |     |    |        |    | DDLTP |       |
| 5   | INTERRUPT LINKAGE TABLE POINTER |   |     |     |   |   |   |      |                  |      |     |    |        |    | DILTP |       |
| 6   | (SEE BELOW)                     |   |     |     |   |   |   |      |                  |      |     |    |        |    | DSTAT |       |
| 7   | ERROR STATUS IF NOT 0           |   |     |     |   |   |   |      |                  |      |     |    |        |    | DSERR |       |
| %10 | REQUESTED WORD COUNT            |   |     |     |   |   |   |      |                  |      |     |    |        |    | DWCNT |       |

DSTAT bits:

BIT0=SIO OK

BIT1=0

BIT2=INT PENDING

BIT3=TIMING ERROR

BIT4=LIGHT DARK CHECK

BITS 5-6 = 00 COLUMN BINARY MODE

01 UNUSED

10 PACKED BINARY MODE

11 HOLLERITH-TO-ASCII MODE

BIT7=COMPARE ERROR

BIT8=EOF DETECTED

BITS 9-10 = 00 NORMAL

01 HOPPER EMPTY

10 UNUSED

11 STACKER FULL

BIT11=INVALID HOLLERITH

BIT12=PICK FAIL OR MOTOR CHECK

BIT13=TEST

BIT14=TROUBLE

BIT15=NOT READY

## CARD READER DIT FIELD DEFINITIONS

-----

DFLAG - Flags and device state

ACTIVE            Monitor is currently active servicing this device.

REQUEST          Service for this device was requested while the monitor was active.

IOPROG          SIO program in progress.

IAK              Interrupt occurred or request aborted or preempted.

READDONE        Previous read resulted in an EOF with a backup save requested. The data has been saved in an auxiliary buffer and will be passed back on the next read request.

NRMESSAGE       Set when a not ready message has been issued, and cleared when the reader is found ready. Used to prevent multiple Not Ready messages when power is turned on.

MSTATE          Monitor State. See SIODM specifications for details.

DLINK - SYSDB relative pointer to the DIT for the next device requesting service for this resource.

DIOQP - SYSDB relative pointer to the first IOQ element in the request list for this device.

DLDEV - Logical device number and unit number.

UNIT            Unit number of device.

LDEVN           Logical device number.

DDLTP - SYSDB relative pointer to driver linkage table (DLT).

DILTP - SYSDB relative pointer to interrupt linkage table (ILT).

DSTAT - Device interrupt status. Contains the device interrupt status at the last interrupt. See hardware ERS for details.

DSERR - Device interrupt error status. If not zero, then holds the device interrupt status from an operation with an erroneous completion status. Causes SIODM to log an error.

DWCNT - Holds the requested transfer count in words.



# Device Information Table for HPiB Card Reader

There is one DIT per physical device. If a physical device represents more than one logical device, the logical device number is obtained from the IOQ element. The following diagram shows the DIT used for the card reader driver.

| 0                                                                                                 | 1                                                                                                                                    | 2  | 3            | 4  | 5 | 6                     | 7 | 8  | 9  | 10 | 11 | 12 | 13    | 14 | 15 | MNEMONIC  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----|--------------|----|---|-----------------------|---|----|----|----|----|----|-------|----|----|-----------|
| +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+                                 |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 0                                                                                                 | 0                                                                                                                                    | 0  | AC           | RQ | 0 | MU                    | 0 | IO | IA | NO | ST | 0  | STATE |    |    | DFLAG     |
| +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+                                 |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 1                                                                                                 | SYSDB relative pointer to the DIT for the next device requesting this resource or service                                            |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DLINK     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 2                                                                                                 | SYSDB relative pointer to the first IOQ in request list for this device                                                              |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DIOQP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 3                                                                                                 | IOT                                                                                                                                  |    | Phys. unit # |    |   | Logical device number |   |    |    |    |    |    |       |    |    | DLDEV     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 4                                                                                                 | SYSDB relative pointer to Device Linkage Table                                                                                       |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DDLTP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 5                                                                                                 | SYSDB relative pntr to Interrupt Linkage Table                                                                                       |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DILTP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 6                                                                                                 |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DRQST     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| 7                                                                                                 | Hardware error status. Set when the driver detects an error. Whenever <>0, the driver monitor logs an I/O error and clears this word |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DSERR     |
| +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+                                 |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| %10                                                                                               | RD                                                                                                                                   | NM |              |    |   |                       |   |    |    |    |    |    |       |    |    | DSAVE     |
| +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+                                 |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| %11                                                                                               | Request word count                                                                                                                   |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DWCNT     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |
| %12                                                                                               | Interrupt Status for this unit. Set by the driver each time it processes an interrupt.                                               |    |              |    |   |                       |   |    |    |    |    |    |       |    |    | DLOGERROR |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |    |              |    |   |                       |   |    |    |    |    |    |       |    |    |           |

## DFLAG - Flags and request state

- AC ACTIVE - A monitor is currently servicing this device.
- RQ REQUEST - A service request is pending while the monitor is active.
- MU MUNIT - This device is on a multi-unit controller.
- IO IOPROG - An I/O Channel Program is running for this device.
- IA IAK - An interrupt or response has occurred for this device.
- NO NOTRDY - Go to state %10 after Idle Channel Program is started.
- ST STWAIT - The device monitor is starting an Idle Channel Program for this device. There is no IOQ associated with this type of request.

STATE - State of the device monitor. Specifies the next action to be taken in SIODM in servicing the request:

- 0 - start new request
- 1 - not used
- 2 - call driver initiator procedure
- 3 - call driver completor procedure
- 4 - not used
- 5 - process request completed
- 6 - initiate device recognition sequence
- 7 - start operator intervention wait
- %10 - wait for interrupt (operator intervention)  
restart at state 0
- %11 - wait for data segment freeze, then state 2
- %12 - wait for driver initiator to be frozen, then  
allocate controller (state 2)
- %13 - wait for I/O completion interrupt, then state 3
- %14 - wait for controller, then call driver initiator
- %15 - not used
- %16 - wait for initiator make present, then state 2
- %17 - wait for completor make present, then state 3

DLDEV - Device logical device number

IOT I/O TYPE - I/O System type

- 0 = Series II / III I/O system
- 1 = HP-IB
- 2 = unused
- 3 = unused

DSAVE - Device processing flags

RD READDONE - A card has already been read.

NM NRMESSAGE - Indicates if not ready message has been issued to the operator's console.

|     | 0                                            | 1     | 2      | 3        | 4       | 5  | 6        | 7                | 8          | 9             | 10    | 11       | 12      | 13 | 14 | 15        |                 |          |
|-----|----------------------------------------------|-------|--------|----------|---------|----|----------|------------------|------------|---------------|-------|----------|---------|----|----|-----------|-----------------|----------|
| 0   | TM                                           | UP    | AC     | RQ       | SH      | SP | MA       | PR               | NL         | PC            | TC    | BR       | DSTATE  |    |    |           | 0               |          |
| 1   | SYSIO PROCESS NEXT DIT POINTER               |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 1 DLINK         |          |
| 2   | FIRST REQUEST IOQ POINTER                    |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 2 DIOQP         |          |
| 3   | FL                                           | NE    | RF     |          |         |    |          | LOGICAL DEVICE # |            |               |       |          |         |    |    | 3 DLDEV   |                 |          |
| 4   | DLT POINTER                                  |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 4 DDLTP         |          |
| 5   | ILT POINTER                                  |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 5 DILTP         |          |
| 6   | HU                                           | DC    | CF     | TT       | TO      | AW | SW       | SE               | RT         | OL            | DR    | LO       | BK      | SK | BT | SD        | 6 DRQST         |          |
| 7   | TM                                           | TR    | DLECH  | FF       | TTYTYPE |    |          |                  | WX         |               | CI    | PAIRCODE |         |    |    |           | 7 DTYPE         |          |
| %10 | PM                                           | MTYPE |        | CF       | CB      | SB | NS       | RC               | WD         | PR            | TMODE | LP       | LEVEL   |    |    |           | 8 DMODEM        |          |
| 11  | TM                                           | RS    | EO     | EC       | SS      | SB | OUTSPEED |                  |            |               | RT    | BO       | INSPEED |    |    |           | 9 DSPEED        |          |
| 12  | HW                                           | LL    | SS     | DONXTMOD |         | DM | PO       | OP               | NEXTDSTATE |               |       |          | PS      | FL | AE | 10 DCNTRL |                 |          |
| 13  | REQUESTED BYTE COUNT                         |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 11 DRBCT        |          |
| 14  | RD CHAR ALREADY INPUT/CHARS LEFT TO WRITE    |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 12 DBCNT        |          |
| 15  | WAITEDSTATE                                  |       | HSTATE |          | TW      | DA | CC       | BC               | PE         | SR            |       | II       | CO      |    |    |           |                 | 13 DSAVE |
| 16  | SUBSYS BREAK CHAR                            |       |        |          |         |    |          |                  | EOR CHAR   |               |       |          |         |    |    |           | 14 DSTOP        |          |
| 17  | DITP OF NEXT DEV WAITING FOR BANDWIDTH       |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 15 DWAIT        |          |
| %20 | WRITE BYTES TRANSFERRED SO FAR               |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 16 DXCNT/DBTIME |          |
| 21  | BYTE COUNT OF EOF SAVED DATA                 |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 17 DRCNT        |          |
| 22  | READ/WRITE COUNT TO END OF CURRENT TBUF      |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 18 DCNT         |          |
| 23  | HEAD POINTER TO READ/WRITE TBUFS             |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 19 DHEAD        |          |
| 24  | TAIL POINTER TO READ/WRITE TBUFS             |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 20 DTAIL        |          |
| 25  | BYTE OFFSET IN TBUF TO START CHANNEL PROGRAM |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 21 DPNTR        |          |
| 26  | HEAD POINTER TO EOF SAVED READ TBUFS         |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 22 DRPTR        |          |
| 27  | TERM TYPE                                    |       |        |          |         |    | BW       | EB               | NF         | DEFAULT SPEED |       |          |         |    |    |           |                 | 23 DLAST |
| %30 | POINTER TO NEXT DIT IN TBUF WAIT LIST        |       |        |          |         |    |          |                  |            |               |       |          |         |    |    |           | 24 DTBL         |          |

|    |                                             |    |                |
|----|---------------------------------------------|----|----------------|
| 31 | POINTER TO SAVED TBUF AFTER TBUF WAIT       | 25 | DNXTB          |
| 32 | TOTAL READ TIME / 1ST WORD OF TIMER READING | 26 | DRTIME/DRTIMED |
| 33 | 2ND WORD OF TIMER READING                   | 27 |                |
| 34 | MAX READ TIME IN SECONDS                    | 28 | DRTMAX         |
| 35 | LF SYNC   CR SYNC   SYNC COUNT              | 29 | DSYNC          |
| 36 | IOQP TO INFO ON SAVED BROKEN READ DATA      | 30 | DBREAK         |
| 37 | 2640 TRLX   LGON/HNGUP/RDTIMR TRLX          | 31 | DTRLX          |
| 40 | CFAIL TRLX   TURN TRLX                      | 32 |                |
| 41 | NUMBER OF BYTES IN OUTSTANDING TANKS        | 33 |                |
| 42 | LGNTY SYNST  CFAIL COUNT   LF COUNT         | 34 | DMONTR         |
| 43 | POINTER TO BEGINNING OF SIO PROGRAM         | 35 | DSIOPC         |
| 44 | POINTER TO SECOND TBUF USED FOR READ        | 36 | DBLKTAIL       |

# DIT INFORMATION

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## 0 - DFLAG

- .TERM (0:1) - SET IF DEVICE IS A TERMINAL
- .UP (1:1) - SET IF DEVICE IS ON LINE AND HAS BEEN SPEED SENSED,  
OR HAS BEEN INITIALIZED (BY ALLOCATING TERMINAL)  
AND READY TO DO IO
- .ACTIVE (2:1)- SET IF IOTERM0 IS CURRENTLY ACTIVE SERVICING THIS  
TERMINAL
- .REQUEST (3:1)- SET IF SERVICE FOR THIS TERMINAL IS REQUESTED  
WHILE IOTERM0 IS ACTIVE
- .SPECIH (4:1) - SET IF SPECIAL INTERRUPT HANDLER IS USED, NOT  
APPLICABLE
- .SPOOLING (5:1) - A READ OPERATION TO USE SYSBUF HAS BEEN REQUESTED  
THROUGH THE PTAPE PROCEDURE
- .MODACTIVE (6:1) - SET IF SIO PROGRAM TO CONTROL MODEMS IS  
CURRENTLY ACTIVE
- .PAIR (7:1) - SET (1) WHEN NO READ IS IN PROGRESS, OR (2) DURING  
READING, THE NEXT CHARACTER INPUT MAY REQUIRE SOME  
SPECIAL ACTION, SEE PAIRCODE FOR DETAILS
- .NEWLINE (8:1) - SET IF THE LAST CHARACTER OUTPUT IS A LF, USED  
TO DETERMINE IF A CR/LF IS NECESSARY DURING  
MODE CHANGES OR AT FOPEN TIME
- .PTYCHK (9:1) - SET IF PARITY CHECKING/GENERATION IS ENABLED, ODD/  
EVEN PARITY IS DETERMINED BY ODDPTY IN DCNTRL
- .TERMCHAR (10:1) - SEE BINREAD
- .BINREAD (11:1) --

TERMCHAR BINREAD

-----

|   |   |                                                                                                                                                                                   |
|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | 0 | REGULAR READ                                                                                                                                                                      |
| 0 | 1 | BINARY READ IN PROGRESS, THE READ<br>IS ONLY TERMINATED WHEN THE<br>REQUESTED BYTE COUNT IS SATISFIED                                                                             |
| 1 | 0 | SPECIAL EOR CHARACTER IS SPECIFIED<br>IN QP2 TO TERMINATE READ                                                                                                                    |
| 1 | 1 | TRANSPARENT READ IN PROGRESS, NO<br>EDITING IS PERFORMED ON INPUT DATA,<br>READ IS TERMINATED BY EOR CHARACTER<br>SPECIFIED IN DSTOP OR QP2 OR SUBSYS<br>BREAK CHARACTER IN DSTOP |

- .ENQACKWAIT (11:1) - DURING WRITE, BIT 11 IS SET WHEN THE CURRENT  
CHANNEL PROGRAM SUSPENDS THE WRITE BY SENDING  
AN ENQ AND THEN WAITS FOR AN ACK FROM THE  
TERMINAL

.DSTATE(12:4) - DEVICE STATE OF THE TERMINAL, SPECIFIES THE  
CURRENT ACTIVITY AND DETERMINES THE NEXT STATE

- 1 - WRITING
- 2 - READING
- 4 - TURN202; CURRENTLY TURNING AROUND THE 202 MODEM TO DO  
READ OR WRITE, NEXT DSTATE IS IN DCNTRL.NXTDSTATE
- 6 - EORLF; END OF RECORD CARRIAGE CONTROL IN PROGRESS, NULL  
STATE NEXT
- 7 - SPDSSENSW -- SPEED SENSE SIO IN PROGRESS
- %10 - EORSYNC
- %11 - WAITED; READ OR WRITE OPERATION BEING SUSPENDED, WAITING  
FOR IOTERMO TO CHECK IF BREAK IS ALLOWED
- %14 - REPEATING; "!!!" BEING WRITTEN AFTER CONTROL X IS  
DETECTED, EORLF NEXT TO OUTPUT CR/LF
- %16 - MODEMSIO; CHANNEL PROGRAM CURRENTLY ACTIVE IN SETTING UP  
THE ADCC MODEM CONTROL LOGIC. WHEN THE CHANNEL PROGRAM  
COMPLETES, IF DCNTRL.DOMOD IS SET, A NEW CHANNEL PROGRAM  
IS STARTED TO SET THE MODEM LOGIC TO A NEW SET OF  
CONDITIONS. THE NEXT DSTATE IS IN NXTDSTATE.
- %17 - FINREAD; FINISH UP READ OPERATION AND PERFORM THE DSTATE  
INDICATEDIN NXTDSTATE.

1 - DLINK

LINK WORD FOR A LINKED LIST OF DEVICES WAITING FOR SERVICE BY THE  
SYSTEM I/O PROCESS.

0 => NONE WAITING

-1 => LAST DEVICE ON LINKED LIST

DITP -- A POINTER TO THE DIT OF THE NEXT WAITING DEVICE

2 - DIOQP

SYSDB RELATIVE POINTER TO THE 1ST IOQ ELEMENT IN THE SERVICE  
REQUEST LIST FOR THIS DEVICE

3 - DLDEV

.FLUSH (0:1) - SET WHEN A BREAK HAS BEEN DETECTED AND ACCEPTED.  
AS LONG AS IT REMAINS SET, ALL WRITE REQUESTS ARE  
RETURNED AS COMPLETED WITHOUT ANY ACTUAL I/O  
BEING PERFORMED. READS ARE RETURNED WITH AN  
UNUSUAL CONDITION STATUS, %173.

.NOCXECHO (1:1) - IF SET, THEN "!!!" IS NOT ECHOED WHEN A CONTROL  
X TO DELETE A LINE HAS BEEN DETECTED

.RDFLUSH (2:1) - NO TBUFS; FLUSH READ, WAIT FOR EOR

.LDEVN (8:8) - LOGICAL DEVICE NUMBER

.ABORWRT (5:1) - WRITE SIO HAS BEEN ABORTED

4 - DDLTP

SYSDB RELATIVE POINTER TO THE DRIVER LINKAGE TABLE (DLT)

5 - DILTP

SYSDB RELATIVE POINTER TO INTERRUPT LINKAGE TABLE (ILT)

## 6 - DRQST

REQUESTS FOR IOTERMO SERVICE THAT HAVE BEEN GENERATED BY TIP.  
THE REQUESTS ARE SERVICED IN A LEFT TO RIGHT ORDER, SO THE BIT  
POSITION DETERMINES THE REQUEST PRIORITY.

- .HANGUP (0:1) - DATASET HANGUP TIMEOUT HAS BEEN COMPLETED
- .DISCNET (1:1) - DATASET HAS BEEN DISCONNECTED (CC HAS DROPPED)
- .CFAILTO (2:1) - TIMEOUT FOR CARRIER FAIL HAS BEEN COMPLETED,  
HANGUP A 103 MODEM OR TRY TO TURNAROUND A 202.
- .TURNTO (3:1) - CB OR SB FROM THE 202 MODEM DID NOT RISE 5 SECONDS  
AFTER STARTING THE "READ TO WRITE TURNAROUND",  
HANG UP THE DATASET.
- .264OTO (4:1) - A 10 SECOND TIMEOUT TO WAIT FOR AN ACK FROM THE  
TERMINAL HAS EXPIRED, TERMINATE THE WAIT AND  
RESTART THE WRITE OPERATION
- .SPOOLSW (6:1) - ONE OF THE TWO SYSBUFS USED FOR PTAPE READ HAS  
BEEN FILLED, SWITCH THEM SO THAT IT CAN BE EMPTIED  
ONTO DISC.
- .SPOOLEND (7:1) - A CONTROL Y TO TERMINATE PTAPE READ HAS BEEN  
DETECTED
- .READTO (8:1) - A READ OPERATION HAS BEEN TIMED OUT
- .ONLINE (9:1) - ALSO SPFOUND, A CR HAS BEEN INPUT AND SPEED  
SENSED, INITIATE A LOG ON TIMEOUT
- .DSETRDY (10:1) - DATASET READY (CC) HAS BEEN DETECTED, INITIATE  
A LOGON TIMEOUT
- .LOGONTO (11:1) - A LOGON TIMEOUT HAS EXPIRED AND THE CALLER STILL  
HAS NOT LOGGED ON; HANGUP THE DEVICE
- .BRK (12:1) - A BREAK HAS BEEN DETECTED, OR SB FROM THE DATASET HAS  
DROPPED DURING A WRITE OPERATION
- .SSBRK (13:1) - A SUBSYSTEM BREAK HAS BEEN DETECTED
- .BLOCKTO (14:1) - BLOCK MODE READ HAS TIMED OUT
- .STATDONE (15:1) -

## 7 - DTYPE

- .TIMING (0:1) - SET IF THE TIME REQUIRED TO DOMplete THE CURRENT  
READ OPERATION IS TO BE RECORDED, THE STARTING  
TIME HAS BEEN RECORDED IN DRTIME, WHEN THE READ  
IS COMPLETED, THE ELAPSED TIME WILL BE SAVED IN  
DRTIME
- .TIMEREAD (1:1) - SET WHEN THERE IS A REQUEST TO MEASURE THE TIME  
REQUIRED TO COMPLETE A READ OPERATION, CAUSES  
TIMING TO GET SET WHEN THE READ IS INITIATED.
- .DELECHO (2:2) - THIS FIELD CONTAINS A CODE WHICH SPECIFIES THE  
REQUIRED ACTION WHEN A CONTROL H IS DETECTED
- .FORMFEED (4:1) - SET FOR TERMINALS THAT RESPOND TO A FORMFEED, IF  
CLEAR, A LF IS SENT IN PLACE OF THE FF CHARACTER;  
THE CHARACTER TO BE OUTPUT (FF OR LF) IS PRECEDED  
BY A XOFF AND CR.
- .TTYTYPE (5:5) - TERMINAL TYPE, A SUBSET OF THE SERIES III TERM TYPES
- .WAITXON (10:1) - WAITING FOR XON
- .CONSINTRPT (11:1) - SET IF CONTROL A CAN BE ACKNOWLEDGED WHEN THE  
TERMINAL IS USED AS A SYSTEM CONSOLE

- .PAIRCODE (12:4) - WHEN THE NEXT INCOMING CHARACTER MAY REQUIRE SPECIAL ACTION, THIS FIELD CONTAINS A SPECIAL CODE SPECIFYING THE CONDITIONS AND ACTIONS TO BE TAKEN:
- 0 - NO READ IN PROGRESS
  - 1 - CRWAIT; A BLOCK MODE READ HAS BEEN SATISFIED AND STOPPED, NOW WAITING FOR A CR TO COMPLETE THE READ
  - 2 - CRWAITLF; SAME AS CRWAIT BUT AFTER THE CR IS DETECTED, A LF IS TO BE ECHOED IF REQUESTED
  - 3 - NOECHO; A TERMTYPE 11 READ HAS BEEN STARTED WITH ECHO OFF, IF THE FIRST INCOMING CHARACTER IS A DC2, THEN A BLOCK MODE READ IS ABOUT TO BEGIN, OTHERWISE THE CHARACTER IS TO BE ECHOED BACK TO THE TERMINAL AND ECHO TO BE TURNED BACK ON.
  - 4 - DC2PAIR; THE LAST CHARACTER READ WAS A DC2, IF THE NEXT CHARACTER IS A CR AND IF OWN DC1/DC2 HANDSHAKE IS ENABLED, THE READ OPERATION WILL BE COMPLETE; IF THE NEXT CHARACTER IS A CR AND OWN DC1/DC2 HANDSHAKE DISABLED, THEN THE CR IS IGNORED AND READ WILL CONTINUE.
  - 5 - NODATAYET; A REGULAR READ HAS BEEN STARTED WITH ECHO ON.

#### 8 - DMODEM

- .PREMPT (0:1) - WHEN SET BY ATTACHIO, AT LEAST ONE PENDING REQUEST IS PREEMPTIVE
- .MTYPE (1:3) - MODEM TYPE:
- 0 - HARDWIRED TERMINAL
  - 1 - 103 MODEM
  - 2 - 202C MODEM
  - 3 - 2002 MODEM
  - 4-7 => SAME AS 0-3, BUT NO SPEED SENSING (6&7 NOT CURRENTLY SUPPORTED)
- .CF (4:1) - CURRENT CARRIER DETECT STATUS FROM MODEM
- .CB (5:1) - CURRENT CLEAR TO SEND STATUS FROM MODEM
- .SB (6:1) - CURRENT SECONDARY RECEIVE STATUS FROM MODEM
- .NOSYNC (7:1) - SET FOR HP263X, HP264X TERMINALS; INDICATES THAT NO DELAYS BETWEEN CHARACTERS ARE NECESSARY FOR THIS TERMINAL, INSTEAD, AN ENQ IS SENT AFTER EVERY 80 CHARACTERS AND THE WRITE OPERATION IS SUSPENDED UNTIL AN ACK IS RECEIVED OR A 10 SECOND TIMEOUT OCCURS.
- .PRIMED (10:1) - INDICATES THAT A DC2 HAS BEEN RECEIVED FROM THE TERMINAL DOING A FAST READ. A BLOCK MODE READ IS IN PROGRESS.
- .TMODE (11:2) - TERMINAL MODE:
- 0 - NORMAL
  - 1 - BREAK MODE
  - 2 - CONSOLE MODE
  - 3 - CONSOLE MODE AND RETURN TO BREAK MODE
- .LPLEVEL (13:3) - PREEMPT LEVEL OF LAST REQUEST, IF PREEMPT LEVEL OF THE NEW REQUEST IS HIGHER, CR/LF IS TO BE OUTPUT TO THE TERMINAL:
- 0 - NORMAL REQUEST
  - 2 - NORMAL REQUEST WITH TERMINAL IN CONSOLE MODE
  - 3 - SOFT PREEMPT (PREEMPT READ OPERATION THAT HAS NOT INPUT ANY DATA YET)
  - 4 - HARD PREEMPT (PREEMPT ALL READS)



9 - DSPEED

- .TAPEMODE (0:1) - CURRENT INPUT IS FROM PAPER TAPE, INCOMING CHARACTERS ARE TRANSPARENT
- .RESTART (1:1) - WHEN THE TERMINAL IS IN TAPEMODE OR BLOCK MODE READ AND A CONTROL X HAS BEEN DETECTED, PAIRCODE IS SET TO CRWAIT TO WAIT FOR A CR T TERMINATE THE READ, AT WHICH TIME THE READ IS TO BE RESTARTED
- .ECHOON (2:1) - ECHO WAS TURNED OFF, REENABLE IT FOR CURRENT OPERATION
- .ECHO (3:1) - IF SET, ALL INCOMING CHARACTERS ARE TO BE ECHOED IF OPERATING IN FULL DUPLEX MODE
- .SPDSSENSING (4:1) - SET IF CURRENTLY IN SPEED SENSE MODE, THE FIRST PORTION OF A POSSIBLE CR HAS BEEN IDENTIFIED AND WAITING TO RECEIVE THE REST OF THE CHARACTER.
- .SSBRKOK (5:1) - SUBSYSTEM BREAKS HAVE BEEN ENABLED VIA A FCONTROL CALL.
- .OUTSPEED (6:4) - CONTAINS AN ADCC CODE FOR THE CURRENT OUTPUT BAUDRATE; ADCC CODES FOR DIFFERENT BAUDRATES:
  - % 7 - 240 CPS
  - %10 - 960 CPS
  - %11 - 480 CPS
  - %13 - 120 CPS
  - %15 - 30 CPS
  - %16 - 15 CPS
  - %17 - 10 CPS
- .RESTARTSPDS (10:1) - RESTART IDLE WAIT OR SPEEDSENSE AFTER CURRENT CHANNEL PROGRAM COMPLETES.
- .BRKOK (11:1) - BREAK IS ALLOWED IF SET, OTHERWISE IGNORED. SET AND CLEARED VIA FCONTROL CALLS.
- .INSPEED (12:4) - CONTAINS AN ADCC CODE FOR THE CURRENT INPUT BAUDRATE

10 - DCNTRL

- .HIOPWAIT (0:1) - THE ACTIVE CHANNEL PROGRAM CANNOT BE HALTED IMMEDIATELY WHEN AN HIOP INSTRUCTION WAS EXECUTED; A SUBSEQUENT INTERRUPT WILL OCCUR AND SOFTWARE IS TO IGNORE IT.
- .LFLAST (1:1) - A POSTSPACE LF HAS BEEN TANKED IN THE WRITE TBUF'S
- .SPDSIO (2:1) - SET WHEN AN IDLE WAIT CHANNEL PROGRAM IS ACTIVE, WHEN THE TERMINAL IS NOT ACTIVE DOING READ/WRITE, AN IDLE WAIT PROGRAM IS STARTED TO LISTEN TO THE KEYBOARD.
- .DONXTMOD (3:3) - AN ATTEMPT TO START A CHANNEL PROGRAM TO CONTROL THE ADCC MODEM LINES FAILED BECAUSE A PREVIOUS MODEM CONTROL PROGRAM IS STILL ACTIVE. THIS FIELD CONTAINS A CODE SPECIFYING THE CONTROL TO BE DONE WHEN THE PREVIOUS CHANNEL PROGRAM COMPLETES AND THE NEW ONE CAN BE STARTED.
- .DOMOD (6:1) - ATTEMPT TO START A MODEM CONTROL CHANNEL PROGRAM FAILED BECAUSE A PREVIOUS ONE IS STILL ACTIVE; WHEN IT COMPLETES, START THE MODEM CONTROL CHANNEL PROGRAM AS SPECIFIED IN DONXTMOD

- .PTYON (7:1) - SPECIFIES PARITY GENERATION ON WRITE DATA AND PARITY CHECKING ON READ DATA
  - .ODDPTY (8:1) - IF SET, ODD PARITY IS USED FOR GENERATION AND CHECKING, OTHERWISE EVEN PARITY IS USED.
  - .NXTDSTATE (9:4) - CONTAINS THE NEXT DSTATE TO BE USED WHEN A 202 MODEM TURNAROUND IS COMPLETED, ALSO CONTAINS THE NEXT DSTATE WHEN A FINISHREAD (DSTATE=%17) OPERATION IS COMPLETED.
  - .PRESPLAST (13:1) - INDICATES THAT THE LAST WRITE OPERATION WAS A PRESPLACE WRITE, IF THE NEXT WRITE IS POSTSPACE AND NEWLINE IS NOT SET THEN A CR/LF IS OUTPUT TO START WRITING A NEW LINE.
  - .FILLING (14:1) - INDICATES THAT IOTERM0 IS CURRENTLY TRANSFERRING WRITE DATA FROM THE CALLER'S STACK INTO A TBUF.
  - .ADDENQ (15:1) - IOTERM0 IS CURRENTLY PUTTING AN ENQ INTO THE TBUF AFTER 80 BYTES OF WRITE DATA HAVE BEEN TANKED.
- 11 - DRBCT  
HOLDS THE REQUESTED READ/WRITE BYTE COUNT
- 12 - DBCNT  
DURING A READ OPERATION, IT SPECIFIES THE NUMBER OF BYTES THAT HAVE BEEN READ. DURING A WRITE OPERATION, IT SPECIFIES THE NUMBER OF BYTES REMAINING TO BE WRITTEN.
- 13 - DSAVE
- .WAITEDSTATE (0:4) - HOLDS THE CURRENT DSTATE WHEN A BREAK IS DETECTED AND THE CURRENT OPERATION SUSPENDED SO THAT IOTERM0 MAY CHECK THAT BREAK IS ALLOWED, IF DISALLOWED, THE CURRENT DSTATE WILL BE RESUMED.
  - .HSTATE (4:3) - THE MODEM HANGUP STATE:
    - 0 - NULL OR HUNGUP
    - 1 - ON LINE OR NORMAL OPERATION
    - 2 - LOGGINGON; LOG ON TIMEOUT IN PROGRESS
    - 4 - DCLOSE ISSUED, DISCONNECT NEXT
    - 6 - HANGUPTURN; HANGUP TURNAROUND TO READ IN PROGRESS, THE 202 MODEM NEEDS TO BE IN A READING STATE BEFORE HANGUP
    - 7 - HANGUP SETTTLING TIMEOUT IN PROGRESS
  - .TURN202 (7:1) - WHEN THE 202 MODEM IS BEING TURNAROUND (DSTATE=TURN202), A 1 INDICATES TURNAROUND TO WRITE, A 0 INDICATES TURNAROUND TO READ.
  - .DELACK (8:1) - AN ENQ HAS JUST BEEN SENT DURING A WRITE WHEN A BREAK WAS DETECTED, DELAY THE NEXT WRITE FOR 0.5 SECOND TO AVOID OVERRUNNING THE TERMINAL.
  - .CC (9:1) - THE CURRENT DATASET READY STATUS FROM MODEM
  - .BLOCKRD (10:1) - DURING A READ OPERATION, 2 CHANNEL PROGRAMS, EACH WITH ITS OWN TBUF, ARE USED TO SERVICE INCOMING DATA; THIS BIT IS SET IF THE 2ND CHANNEL PROGRAM IS CURRENTLY ACTIVE RECEIVING DATA.
  - .AUTOEJECT (11:1) - 2631B WILL SKIP OVER PERFORATIONS
  - .REQSTAT (13:1) - REQUESTING 2631B STATUS
  - .ININ (14:1) - INITIALIZING TERMINAL PORT
  - .CCON (15:1) - CC ALWAYS ON

- 14 - DSTOP  
 IF NOT ZERO, CONTAINS THE USER SPECIFIED SUBSYSTEM BREAK AND  
 END OF RECORD CHARACTERS. IF THEY ARE SPECIFIED, THEN NO EDITING  
 IS DONE TO THE INCOMING DATA DURING A READ.  
 .BRKCHAR (0:8) - DETECTION OF THIS CHARACTER DURING READING CAUSES  
 THE SAME ACTION AS THAT OF A CONTROL Y.  
 .EORCHAR (8:8) - DETECTION OF THIS CHARACTER TERMINATES THE READ  
 AND IS INCLUDED WITH THE REST OF THE READ DATA TO  
 BE TRANSFERED TO THE CALLERS STACK
- 15 - DWAIT  
 LINK WORD FOR A LINKED LIST OF DIT'S WAITING TO DO I/O WHEN THE  
 TERMINAL ACTIVITY DECREASES,  
 0 - NONE WAITING  
 -1 - THIS DIT IS THE LAST ONE ON THE LIST  
 OTHER - A DIT POINTER TO THE NEXT DEVICE WAITING
- 16 - DXCNT(WRITE)/DBTIME(READ)  
 DXCNT (VALID DURING WRITES) INDICATES THE NUMBER OF BYTES TRANSFERRED  
 SO FAR INTO TBUF'S WHEN CARRIAGE CONTROL BYTES OR DATA BYTES ARE  
 BEING TANKED. USED TO RESTART THE FILL TBUF OPERATION WHEN 540  
 BYTES HAVE ALREADY BEEN TANKED AND THE FILL OPERATION HAS TO BE  
 SUSPENDED.  
 DBTIME (VALID DURING READ) - TIMEOUT PERIOD FOR BLOCKMODE READ.
- 17 - DRCNT  
 CONTAINS THE BYTE COUNT OF THE READ DATA SAVED WHEN AN EOF WAS  
 DETECTED.
- 18 - DCNT  
 DURING A WRITE, IT INDECATES THE NUMBER OF CHARACTERS TO BE  
 WRITTEN BY THE CURRENT EXECUTION OF THE CHANNEL PROGRAM. DURING  
 A READ, IT INDECATES THE NUMBER OF CHARACTERS TO BE READ BY THE  
 CURRENT CHANNEL PROGRAM. WHEN=-2, IT INDECATES THAT ALL TANKED  
 DATA HAS BEEN WRITTEN OUT AND THAT IOTERMO IS INTHE MIDDLE OF  
 FILLING A TBUF. FILLING A TBUF.
- 19 - DHEAD  
 A SYSDB RELATIVE POINTER TO  
 (1) DURING WRITE, THE CURRENT TBUF CONTAINING DATA TO BE WRITTEN,  
 (2) DURING READ, THE 1ST TBUF ON THE LINKED LIST OF INPUT DATA.
- 20 - DTAIL  
 A SYSDB RELATIVE POINTER TO  
 (1) DURING WRITE, THE LAST TBUF ON THE LINKED LIST OF TANKED DATA,  
 (2) DURING READ, THE CURRENT TBUF USED FOR RECEIVING DATA.
- 21 - DPNTR  
 A WORD POINTER USED DURING WRITES TO INDICATE THE OFFSET WITHIN A  
 TBUF OF THE 1ST BYTE OF DATA TO BE WRITTEN BY THE CURRENT CHANNEL  
 PROGRAM.

- 22 - DPNTR  
A SYSDB RELATIVE POINTER TO A LINKED LIST OF TBUF'S CONTAINING THE DATA SAVED WHEN AN EOF WAS DETECTED.
- 23 - DLAST  
.TERMTYPE (0:7) - THE DEFAULT OR CONFIGURED TERM TYPE. WHEN THE TERMINAL IS SPEED SENSED, THIS IS THE TERM TYPE USED.  
.BINWRT (7:1) - SET IF THE LAST WRITE OPERATION WAS IN BINARY MODE.  
.EIGHTBITS (8:1) - SET IF THE 8-BIT PROTOCOL IS USED AND PARITY GENERATION/CHECKING IS DISALLOWED. USED FOR TERM TYPES 12 AND 15.  
.NEWFORM (9:1) - LAST CARRIAGE CONTROL WAS A FORM FEED.  
.DEFAULTSPEED (10:6) - THE ADCC CODE OF THE DEFAULT OR CONFIGURED TERMINAL BAUDRATE.
- 24 - DTBLK  
A DIT POINTER TO THE NEXT TERMINAL WAITING FOR A TBUF.
- 25 - DNXTB  
A POINTER TO A TBUF ALLOCATED TO A TERMINAL WHICH HAS BEEN WAITING; THIS IS TO INSURE THAT A WAITING TERMINAL GETS AT LEAST ONE TBUF WHEN IT COMES TO THE TOP OF THE TBUF WAITING LIST.
- 26, 27 - DRTIME  
DURING A TIMED READ OPERATION, THIS IS THE READING OF THE TIMER AT THE INITIATION OF THE READ. AFTER THE READ IS COMPLETED, THE TOTAL ELAPSED TIME IN 1/100 OF A SECOND IS SAVED IN DRTIME AS A SINGLE WORD. IF IT IS -1 THEN THE ELAPSED TIME WAS GREATER THAN 32K.
- 28 - DRTMAX  
WHEN A TIME LIMIT ON A READ OPERATION IS REQUESTED, THIS QUANTITY REPRESENTS THE MAXIMUM TIME (SECONDS) ALLOWED FOR THE READ OPERATION TO COMPLETE; IF THIS LIMIT IS EXCEEDED, THE READ OPERATION WILL BE TERMINATED.
- 29 - DSYNC  
.LFSYNC (0:4) - CONTAINS THE NUMBER OF SYNC CHARACTERS TO BE SENT AFTER A LF IS OUTPUT  
.CRSYNC (4:4) - CONTAINS THE NUMBER OF SYNC CHARACTERS TO BE SENT AFTER A CR IS OUTPUT  
.SYNBCCOUNT (8:8) - SPECIFIED THE NUMBER OF DATA CHARACTERS THAT CAN BE TANKED BEFORE AN ENQ HAS TO BE INSERTED IN THE TBUF. FOR WRITE OPERATIONS TO A 264X TERMINAL, AFTER 80 CHARACTERS HAVE BEEN SENT SINCE THE LAST ENQ OR THE LAST READ OPERATION, AN ENQ HAS TO BE SENT AND THE WRITE SUSPENDED UNTIL AN ACK IS RECEIVED.
- 30 - DBREAK  
WHEN A BREAK WAS DETECTED DURING A READ OPERATION, THE DATA ALREADY INPUT IS SAVED AND THIS WORD CONTAINS A POINTER TO AN IOQ USED TO STORE THE BYTE COUNT, TBUF HEAD AND TAIL OF THE SAVED DATA.

31,32 - DTRLX

HOLDS TIMEOUT REQUEST INDICES

- .2640TRLX (0:8) - HOLDS THEN INDEX OF A 10 SECOND TIMEOUT REQUEST FOR THE ENQ/ACK HANDSHAKE/BLOCK MODE TIMEOUT
- .RREADTRLX (8:8) - HOLDS THE LOGON, HANGUP AND TIMED READ TIME-OUT REQUEST INDICES
- .CFAILTRLX (0:8) - HOLDS THE INDEX OF A TIMEOUT REQUEST DUE TO LOSS OF CARRIER DETECT FROM THE DATASET.
- .TURNTRLX (8:8) - HOLDS THE INDEX OF A TIMEOUT REQUEST FOR A LINE TURNAROUND ON A 202 DATASET.

33 - DTANKB

A COUNT OF THE BYTES TANKED IN THE LINKED TBUF'S; THIS COUNT IS USUALLY GREATER THAN DBCNT, THE COUNT OF BYTES REMAINING TO BE OUTPUT, BECAUSE THE DATA IN A TBUF IS SENT OUT IN BLOCKS SEPARATED BY AN ENQ.

34 - DMONTR

- .LOGONTYPE (0:2)
- .SYNCSTATE (2:2) STATE OF TANKING LF/SYNC
  - 0 => TANK XOFF/CR; 1=> DETERMINE LF'S TO TANK
  - 2 => TANK LF/SYNC
- .CFAILCNT (4:6) - A COUNT OF THE TIMES WHEN LOSS OF CARRIER DETECT FROM THE DATASET IS DETECTED DURING A READ OPERATION; WHEN THE COUNT EXCEEDS 50, THE USER IS HUNG UP AND THE DATASET DISCONNECTED
- .LFCOUNT (10:6) - NUMBER OF LF'S FOR %2NN CARRIAGE CONTROL

35 - DSIOPC

STORES THE POINTER TO THE CHANNEL PROGRAM WHICH IS TO BE STARTED WHEN A DATASET LINE TURNAROUND IS COMPLETE; THE CHANNEL PROGRAM TO BE STARTED IS EITHER FOR A READ OR WRITE OPERATION.

36 - DBLKTAIL

POINTER TO THE SECOND TBUF SET FOR A READ OPERATION; 2 READ CHANNELPROGRAMS, EACH WITH ONE TBUF, ARE USED TO INSURE AGAINST DATA OVERRUNS DURING FAST BLOCK MODE READS.

# LINE PRINTER DIT (SERIES II/III)

There is one DIT per physical device. If a physical device represents more than one logical device, the logical device number is obtained from the IOQ element. The following diagram shows the DIT used for IOLPRT0.

| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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10 | 11 | 12 | 13 | 14 | 15 | MNEMONIC |
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----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+----- |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |          |

DFLAG.AC - Active. A monitor is currently servicing this device. \*  
 DFLAG.RQ - Request. A service request is pending while the monitor is active. \*  
 DFLAG.IO - An I/O channel program is in progress. Decrement SIOCOUNTER and check for multiple channels when complete. \*  
 DFLAG.AK - Interrupt Acknowledge. An interrupt has occurred. \*  
 DDF .PS - Prespace. The last request was a prespace (space then fill buffer) operation.  
 DDF .NE - Not Empty. The print buffer is not empty. Causes a print when changing from pre- to postspace or before ejecting a page for a File Open, File Close or Device Close.  
 DDF .TF - Top of Form. The last request ended with a skip to channel 1 (page eject).

\* Not examined or modified by IOLPRT0.

DFLAG.STATE - State of the device monitor. Specifies the next action to be taken by SIODM in servicing the request. Not used within IOLPRT0.

DSTAT.(0:1) - SIO OK. Set when no SIO channel program is in progress, that is, it is OK to start one.  
 .(1:1) - WIO OK. Set when it is OK to execute a WIO instruction or a doubleword WRITE channel order. If clear, indicates that a one word transfer is in progress.  
 .(2:1) - Interrupt Pending. If set, indicates one or more bits of the Interrupt Status Byte (DSTAT.(8:8)) are set.  
 .(3:2) - U.I. Transfer State. Used mostly for hardware maintenance. See U.I. card manual (30051-90001) for details.  
 .(5:1) - Device Flag. Indicates a print-and-advance-paper sequence in progress. Since the 2608 buffers such commands, this signal may be shorter than with other printers.  
 .(6:1) - Always 0. DSTAT.(8:8) always contains the Interrupt Status Byte.  
 .(7:1) - Not used. Always 0.  
 .(8:3) - Varies among HP-supported line printers according to the table below:

| SUBTYPE | MODEL(S)                  | BIT 8           | BIT 9        | BIT 10        |
|---------|---------------------------|-----------------|--------------|---------------|
| 0       | 2610, 2614                | LINE<br>PRINTED | READY        | NOT<br>READY  |
| 1       | 2607                      | Not<br>used     | READY        | NOT<br>READY  |
| 2       | 2613, 2617, 2618,<br>2619 | Not<br>used     | READY        | NOT<br>READY  |
| 3       | 2617J (KATAKANA)          | Not<br>used     | READY        | NOT<br>READY  |
| 4       | 2608                      | ON<br>LINE      | NOT<br>READY | VFC<br>CHAN 9 |

- .(11:1) - Data Transfer Interrupt bit. Always 0.
  - .(12:1) - Not used. Always 0.
  - .(13:1) - Programmed Interrupt bit. True if interrupt request was generated by:
    - a) SIN machine instruction,
    - b) INTERRUPT channel order, or
    - c) END-WITH-INTERRUPT channel order.
  - .(14:1) - Transfer Error Interrupt bit. True if interrupt was generated by:
    - a) an illegal memory address,
    - b) a memory parity error, or
    - c) a multiplexer parity error during data xfr to U.I.
  - .(15:1) - Time-out Interrupt bit. Set if 5-second timer on U.I. card is enabled, then times out without being cleared.
- 
- DLAST.(8:8) - Request dependent. If a print request has an odd number of bytes, this word holds the final byte. For VFC downloads, contains the associated data byte (6 or 8 lines per inch and number of lines in VFC). For left margin downloads, also contains the associated data byte (the number of columns to offset).
  - DVFC1.(0:1) - VFC Modified. 2608 only. Indicates that an external VFC has been downloaded into the 2608.
  - DVFC1.(1:1) - Power Fail/Reset. 2608 only. The 2608 has suffered a Power Failure or someone has pressed the front panel Reset button. In either case, the printer's operating environment has been destroyed, and must be reloaded by the operator.
  - DVFC1.(2:1) - Between Jobs. Set when a Device Close is executed, cleared when an FOPEN is performed. 2608 Power Fail/Master Reset's will be cleared but not reported while this bit is set (thus avoiding an extraneous console message when the printer is powered up).
  - DVFC1.(3:1) - TALLY'NOT'READY. Set when an off-line condition is detected on a 2607. Causes a three-second delay when the 2607 comes back on-line.
  - DVFC1.(4:4) - Left margin offset (2608 only). Stored during each :DOWNLOAD which specifies a left margin and restored to printer following a 2608 power fail or reset. Set to 0 when system is initialized.
  - DVFC1.(8:8) - Request dependent. Contains the carriage control byte sent to the printer during a print request.



DVFC2.(0:8) - LINES'LEFT'OVER. Has two functions:

- 1) The 2607/13/17/18/19 can only slew (skip) a maximum of 15 lines per print command (not counting VFC skips, which can be of any length). Slew requests > 15 lines must be broken up. This byte holds the number of lines (greater than 15) which remain to be slewed at any point of a request to such a printer, or 0 if the number of lines to skip is <= 15. This mechanism is not needed (and this field is therefore 0) for CDC and 2608 line printers, which can slew up to 63 lines at a time.
- 2) The carriage control characters "0" in "-" specify double and triple spacing, respectively. But if you use the equivalent channel skip, you get skips to the next odd and third lines, respectively, which is not the same as double and triple spacing. If you slew (advance paper) 2 or 3 lines, you can easily print over the paper perforations unless your program watches out for such things. We avoid this by examining the NO'AUTO'PAGE eject bit (IOQ(QPAR2).(14:1)). If it is set, then the request is treated like a normal slew and LINES'LEFT'OVER is not used. If it is clear (auto eject desired), then we simulate the multiple line skip by doing two ("0") or three ("-") skips to channel 3 (single spaces with auto page eject for the standard VFC). In this case, LINES'LEFT'OVER holds the number of such single spaces remaining in the request.

DVFC2.(8:8) - %202 for 2608, %102 otherwise. Causes skip to channel 3 (single space with auto page eject). Used when last request left data in print buffer (prespace) and current operation is postspace. Buffer is dumped first, using this byte as carriage control.

# 2608 LINE PRINTER DIT (HPIB SYSTEMS)

There is one DIT per physical device. If a physical device represents more than one logical device, the logical device number is obtained from the IOQ element (however, there is only one device per 2608 controller.) The following diagram shows the DIT used for the 2608 line printer driver.

| 0                                                                                                 | 1                                                                                                                                     | 2 | 3            | 4   | 5  | 6 | 7 | 8                     | 9  | 10 | 11 | 12 | 13 | 14    | 15 | MNEMONIC  |       |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---|--------------|-----|----|---|---|-----------------------|----|----|----|----|----|-------|----|-----------|-------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 0                                                                                                 | 0                                                                                                                                     | 0 | 0            | AC  | RQ | 0 | 0 | 0                     | IO | IA | NO | ST | 0  | STATE |    | DFLAG     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 1                                                                                                 | SYSDB relative pointer to the DIT for the next device requesting this resource or service                                             |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DLINK     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 2                                                                                                 | SYSDB relative pointer to the first IOQ in request list for this device                                                               |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DIOQP     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 3                                                                                                 | IOT                                                                                                                                   |   | Phys. unit # |     |    |   |   | Logical device number |    |    |    |    |    |       |    | DLDEV     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 4                                                                                                 | SYSDB relative pointer to Device Linkage Table                                                                                        |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DDLTP     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 5                                                                                                 | SYSDB relative pntr to Interrupt Linkage Table                                                                                        |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DILTP     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 6                                                                                                 | VM                                                                                                                                    |   |              | TAB |    |   |   |                       |    |    |    |    |    | PS    | FL | TP        | DSAVE |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| 7                                                                                                 | Hardware error pointer. Set when the driver detects an error. Whenever <>0, the driver monitor logs an I/O error and clears this word |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DSERR     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| %10                                                                                               | Bit 0 is set at completion of timer                                                                                                   |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DTIME     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| %11                                                                                               | Holds the time out request entry index while a timer is active.                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DRQST     |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |
| %12                                                                                               | Hardware logged error status                                                                                                          |   |              |     |    |   |   |                       |    |    |    |    |    |       |    | DLOGERROR |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                       |   |              |     |    |   |   |                       |    |    |    |    |    |       |    |           |       |

## DFLAG - Flags and request state

- AC ACTIVE - A monitor is currently servicing this device.
- RQ REQUEST - A service request is pending while the monitor is active.
- IO IOPROG - An I/O Channel Program is running for this device.
- IA IAK - An interrupt or response has occurred for this device.
- NO NOTRDY - Go to state %10 after Idle Channel Program is started.
- ST STWAIT - The device monitor is starting an Idle Channel Program for this device. There is no IOQ associated with this type of request.

## STATE

- State of the device monitor. Specifies the next action to be taken in SIODM in servicing the request:
  - 0 - start new request
  - 1 - not used
  - 2 - call driver initiator procedure
  - 3 - call driver completor procedure
  - 4 - not used
  - 5 - process request completed
  - 6 - initiate device recognition sequence
  - 7 - start operator intervention wait
  - %10 - wait for interrupt (operator intervention)  
restart at state 0
  - %11 - wait for data segment freeze, then state 2
  - %12 - wait for driver initiator to be frozen, then  
allocate controller (state 2)
  - %13 - wait for I/O completion interrupt, then state 3
  - %14 - wait for controller, then call driver initiator
  - %15 - not used
  - %16 - wait for initiator make present, then state 2
  - %17 - wait for completor make present, then state 3

DLDEV - I/O system type, unit and logical device number

IOT I/O TYPE- Type of I/O system

- 0 - HP3000 Series II/III
- 1 - HP3000 Series 33 (HP-IB)
- 2 - unused
- 3 - unused

DSAVE - Device processing flags

- VM VFCMOD - VFC has been modified.
- TAB TABDEFAULT - System tab default.
- PS PRESPEC - Last request used prespacing.
- FL FULL - Line printer buffer is full.
- TP TOP - Printer is at top of form

# 2608 Line Printer Status

-----  
 BYTE 1 & BYTE 2:  
 BITS           USE

|    |                                |
|----|--------------------------------|
| 0  | ON LINE                        |
| 1  | NOT READY                      |
| 2  | VFC CHANNEL 9 (BOTTOM OF FORM) |
| 3  | VFC CHANNEL 12 (TOP OF FORM)   |
| 4  | VFC INITIALIZED                |
| 5  | 6/8 LINES PER INCH             |
| 6  | (NOT USED)                     |
| 7  | POWER RESTORED/UNIT RESET      |
| 8  | ON LINE                        |
| 9  | PRINT MECH ERROR               |
| 10 | SELF TEST FAILURE              |
| 11 | PAPER ERROR                    |
| 12 | SELF TEST MODE                 |
| 13 | 6/8 LPI                        |
| 14 | PLATEN/RIBBON ERROR            |
| 15 | (NOT USED)                     |

|          |                                       |
|----------|---------------------------------------|
| BYTE 3:  | PRINT MODE                            |
|          | BITS 0-7 MODE NUMBER                  |
| BYTE 4:  | PRIMARY/SECONDARY                     |
|          | BITS 0-3 SECONDARY CHARACTER SET CODE |
|          | BITS 4-7 PRIMARY CHARACTER SET CODE   |
| BYTE 5:  | SELF TEST                             |
|          | BITS 0 PASS FAIL                      |
|          | BITS 1-7 SUBTEST NUMBER               |
| BYTE 6:  | 6 LPI DOT ROW COUNT                   |
| BYTE 7:  | 6 LPI FORM LINE NUMBER                |
| BYTE 8:  | 6 LPI FORM LENGTH IN LINES            |
| BYTE 9:  | 8 LPI DOT ROW COUNT                   |
| BYTE 10: | 8 LPI FORM LINE NUMBER                |
| BYTE 11: | 8 LPI FORM LENGTH IN LINES            |
| BYTE 12: | FIRMWARE IDENTIFICATION CODE          |
| BYTE 20: | POWER-UP LANGUAGE                     |
|          | BITS 0-3 SECONDARY CHARACTER SET CODE |
|          | BITS 4-7 PRIMARY CHARACTER SET CODE   |

# 2619A OR 2631 LINE PRINTER DIT (FOR HPIB SYSTEMS)

There is one DIT per physical device. If a physical device represents more than one logical device, the logical device number is obtained from the IOQ element (however, there is only one device per 2631 controller.) The following diagram shows the DIT used for the 2631 line printer driver.

| 0                                                                                                 | 1                                                                                                                                    | 2 | 3            | 4  | 5 | 6 | 7 | 8                     | 9  | 10 | 11 | 12 | 13    | 14 | 15    | MNEMONIC  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---|--------------|----|---|---|---|-----------------------|----|----|----|----|-------|----|-------|-----------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 0                                                                                                 | 0                                                                                                                                    | 0 | AC           | RQ | 0 | 0 | 0 | IO                    | IA | NO | ST | 0  | STATE |    |       | DFLAG     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 1                                                                                                 | SYSDB relative pointer to the DIT for the next device requesting this resource or service                                            |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DLINK     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 2                                                                                                 | SYSDB relative pointer to the first IOQ in request list for this device                                                              |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DIOQP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 3                                                                                                 | IOT                                                                                                                                  |   | Phys. unit # |    |   |   |   | Logical device number |    |    |    |    |       |    | DLDEV |           |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 4                                                                                                 | SYSDB relative pointer to Device Linkage Table                                                                                       |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DDLTP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 5                                                                                                 | SYSDB relative pntr to Interrupt Linkage Table                                                                                       |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DILTP     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 6                                                                                                 | BJ AB PS FL TP                                                                                                                       |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DSAVE     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| 7                                                                                                 | Hardware error status. Set when the driver detects an error. Whenever <>0, the driver monitor logs an I/O error and clears this word |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DSERR     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| %10                                                                                               | Bit 0 is set at completion of timer                                                                                                  |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DTIME     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| %11                                                                                               | Holds the time out request entry index while a timer is active.                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DRQST     |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |
| %12                                                                                               | Hardware logged error status                                                                                                         |   |              |    |   |   |   |                       |    |    |    |    |       |    |       | DLOGERROR |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                      |   |              |    |   |   |   |                       |    |    |    |    |       |    |       |           |

## DFLAG - Flags and request state

- AC ACTIVE - A monitor is currently servicing this device.
- RQ REQUEST - A service request is pending while the monitor is active.
- IO IOPROG - An I/O Channel Program is running for this device.
- IA IAK - An interrupt or response has occurred for this device.
- NO NOTRDY - Go to state %10 after Idle Channel Program is started.
- ST STWAIT - The device monitor is starting an Idle Channel Program for this device. There is no IOQ associated with this type of request.

**STATE** - State of the device monitor. Specifies the next action to be taken in SIODM in servicing the request:

- 0 - start new request
- 1 - not used
- 2 - call driver initiator procedure
- 3 - call driver completor procedure
- 4 - not used
- 5 - process request completed
- 6 - initiate device recognition sequence
- 7 - start operator intervention wait
- %10 - wait for interrupt (operator intervention)  
restart at state 0
- %11 - wait for data segment freeze, then state 2
- %12 - wait for driver initiator to be frozen, then  
allocate controller (state 2)
- %13 - wait for I/O completion interrupt, then state 3
- %14 - wait for controller, then call driver initiator
- %15 - not used
- %16 - wait for initiator make present, then state 2
- %17 - wait for completor make present, then state 3

**DLDEV** - I/O system type, unit and logical device number

**IOT I/O TYPE** - Type of I/O system

- 0 - HP3000 Series 2/3
- 1 - HP3000 Series 33 (HPIB)
- 2 - Unused
- 3 - Unused

**DSAVE** - Device processing flags

|           |                 |                                                          |
|-----------|-----------------|----------------------------------------------------------|
| <b>BJ</b> | <b>BETJOB</b>   | - Between jobs flag. If set, suppress Powerfail message. |
| <b>AB</b> | <b>ABORT</b>    | - Abort (caused by Powerfail or Operator) has occurred.  |
| <b>PS</b> | <b>PRESpace</b> | - Last request used prespacing.                          |
| <b>FL</b> | <b>FULL</b>     | - Line printer buffer is full.                           |
| <b>TP</b> | <b>TOP</b>      | - Printer is at top of form                              |

# 2680A DIT

|       | 0 | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |            |
|-------|---|-----|---|---|---|---|---|---|---|---|----|----|----|----|----|----|------------|
| DIT0  | ! | !   | ! | ! | ! | ! | ! | ! | ! | ! | !  | !  | !  | !  | !  | !  | DFLAG      |
| 1     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DLINK      |
| 2     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DIOQP      |
| 3     | ! | IOT | ! |   |   |   |   |   |   |   |    |    |    |    |    | !  | DLDEV      |
| 4     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DDLTP      |
| 5     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DILTP      |
| 6     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DSTAT      |
| 7     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DSERR      |
| 8     | ! | T   | ! |   |   |   |   |   |   |   |    |    |    |    |    | !  | DTIME      |
| 9     | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DTRLX      |
| 10    | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DCBCNT     |
| 11    | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DCWCNT     |
| 12    | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DRCNT      |
| 13    | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DOFFSET    |
| 14    | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DLOGBUFFER |
| 15/29 | ! |     |   |   |   |   |   |   |   |   |    |    |    |    |    | !  | DIOSTAT    |

## DFLAG - DEVICE RELATIVE FLAGS.

|    |                                                                                                                       |
|----|-----------------------------------------------------------------------------------------------------------------------|
| AC | ACTIVE BIT. 1 IMPLIES A MONITOR CURRENTLY SERVICING THIS DEVICE.                                                      |
| RQ | REQUEST BIT. 1 IMPLIES SERVICE REQUESTED WHILE MONITOR IS ACTIVE.                                                     |
| SP | SIO PREEMPTION. IF SET THEN A PREEMPTIVE REQUEST HAS BEEN QUEUED FOR THIS DEVICE. PREEMPT CODE IS SET IN IOQ ELEMENT. |
| CP | CHANNEL PROGRAM IN PROGRESS. IF SET, THEN A CHANNEL PROGRAM IS CURRENTLY EXECUTING.                                   |
| IA | IF SET, AN INTERRUPT OR RESPONSE HAS OCCURED.                                                                         |
| NR | IF SET, DEVICE IS IN A NOT READY OR OPERATOR WAIT.                                                                    |
| SW | IF SET, AN IDLE CHANNEL PROGRAM SHOULD BE STARTED FOR THIS DEVICE.                                                    |

MSTATE CURRENT DRIVER STATE AS DEFINED BY THE MONITOR.

ALLOWABLE STATES ARE:

- 0 - START REQUEST
- 1 - NOT USED(BUT RESERVED)
- 2 - CALL DRIVER INITIATOR
- 3 - CALL DRIVER COMPLETOR
- 4 - UNUSED(BUT RESERVED)
- 5 - COMPLETE REQUEST..PERHAPS RETURN TO USER.
- 6 - UNEXPECTED INTERRUPT OCCURRED.
- 7 - START OPERATOR INTERVENTION WAIT.
- %10 - WAITING (ON OPERATOR). RESTART AT 0.
- 11 - WAITING (DATA MAKEPRESENT/FREEZING)
- 12 - WAITING (INITIATOR CODE MAKEPRESENT/FREEZE)
- 13 - WAITING (FOR COMPLETION INTERRUPT)
- 14 - WAITING (FOR DEVICE CONTROLLER AVAILABILITY)
- 15 - UNUSED(BUT RESERVED)
- 16 - WAITING (INITIATOR CODE MAKEPRESENT)
- 17 - WAITING (COMPLETOR CODE MAKEPRESENT)

DLDEV - I/O SYSTEM TYPE, UNIT AND LOGICAL DEVICE NUMBER.

- IOT I/O SYSTEM TYPE.
- 0 - HP3000 SERIES II/III (SIO/DIO)
  - 1 - HP-IB
  - 2 - RESERVED
  - 3 - RESERVED

DCBCNT - CURRENT BYTE COUNT TO BE TRANSFERRED.

DCWCNT - CURRENT WORD COUNT TO BE TRANSFERRED.

DRCNT - REMAINING WORD COUNT TO TRANSFER.

DOFFSET - OFFSET IN BUFFER OF NEXT # WORDS TO TRANSFER.

DDEBUG - IF BIT 15=1 THEN DEBUGGING INFO WILL BE SENT TO CONSOLE

DLOGBUFFER - STATUS WORDS 1 & 3 ARE MOVED HERE TO BE LOGGED  
IF THEY WERE LOGGED FROM THE I/O STATUS BLOCK  
THEIR CONTENTS MIGHT BE CHANGED BEFORE THEY  
WERE LOGGED.

DIOSAT - I/O STATUS AREA 16 WORDS, SEE I/O STATUS BLOCK DEFINITION.



# I/O STATUS BLOCK

|    | 0 | 1  | 2 | 3  | 4                                          | 5  | 6                                           | 7  | 8 | 9          | 10 | 11 | 12 | 13 | 14 | 15 |        |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|----|---|----|---|----|--------------------------------------------|----|---------------------------------------------|----|---|------------|----|----|----|----|----|----|--------|----|---|----|---|----|---|----|---|----|---|----|---|----|---|----|---|----|
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  |        |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 0  | ! | 0  | ! | -- | THE "OR" OF WORDS 1/15 IS LOCATED HERE---- |    |                                             |    |   |            |    |    |    |    |    |    | DIT 17 |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  |        |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 1  | ! | OF | ! | MS | !                                          | PW | !                                           | PE | ! | TE         | !  | !  | !  | !  | !  | !  | 18     |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  |        |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 2  | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | 19     |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  |        |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 3  | ! |    |   |    |                                            |    | MCS FAULT NUMBER                            |    |   |            |    |    |    |    |    | !  | 20     |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  |        |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 4  | ! | CL | ! | FL | !                                          | VL | !                                           | CU | ! | FU         | !  | VU | !  | IL | !  | IP | !      | ST | ! | SB | ! | IR | ! | MP | ! | NJ | ! | NM | ! | TL | ! | NC | ! | 21 |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 5  | ! | LP | ! | PF | !                                          | NC | !                                           | !  | ! | (RESERVED) | !  | !  | !  | !  | !  | !  | !      | 22 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 6  | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | !      | 23 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 7  | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | !      | 24 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 8  | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | !      | 25 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 9  | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | !      | 26 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 10 | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | !      | 27 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 11 | ! | !  | ! | !  | !                                          | !  | (RESERVED)                                  | !  | ! | !          | !  | !  | !  | !  | !  | !  | !      | 28 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 12 | ! |    |   |    |                                            |    | RECORD NUMBER OF ERROR                      |    |   |            |    |    |    |    |    |    | !      | 29 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + |    |                                            |    | IF WORD 4 IS                                |    |   |            |    |    |    |    |    |    | ---    |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 13 | ! |    |   |    |                                            |    | NON-ZERO                                    |    |   |            |    |    |    |    |    |    | !      | 30 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 14 | ! |    |   |    |                                            |    | SHEET NUMBER OF ERROR IF WORD 4 IS NON-ZERO |    |   |            |    |    |    |    |    |    | !      | 31 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + |    |                                            |    | OR                                          |    |   |            |    |    |    |    |    |    | ---    |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
| 15 | ! |    |   |    |                                            |    | LAST SHEET TRANSFERRED IF "JOB" & POWER-ON  |    |   |            |    |    |    |    |    |    | !      | 32 |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |
|    | + | +  | + | +  | +                                          | +  | +                                           | +  | + | +          | +  | +  | +  | +  | +  | +  | +      |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |   |    |

WORD 0 - EACH BIT IS THE 'OR' OF ONE WORD IN THE TABLE (EXCEPT BIT 0 WHICH IS NOT USED). THEREFORE, BIT .(1:1) IS SET IF WORD 1 IN THE TABLE IS NON-ZERO.

WORD 1 - BIT= 0 - (OF) ONLINE/OFFLINE BIT.  
 1 - (MS) MESSAGE BEING DISPLAYED ON THE 2680A CONSOLE.  
 2 - (PW) POWER UP COMPLETED SINCE LAST I/O STATUS READ.  
 3 - (PE) PARITY ERROR DETECTED ON PHI COMMAND.  
 4 - (TE) TRANSMISSION ERROR DETECTED IN THE PRINTER.  
 5/15 - RESERVED. UNUSED.

WORD 2 - NOT USED. RESERVED.

WORD 3 - MCS FAULT NUMBER. CONTAINS AN INTEGER DESCRIBING THE LAST FAULT TO OCCUR SINCE THE LAST TIME THE I/O STATUS WAS READ OR THE HP2680A WAS POWERED DOWN. IF THE WORD IS ZERO THERE IS NO MCS FAULT. SEE DCS ERS FOR A DESCRIPTION OF THE MCS FAULT NUMBERS.

- WORD 4 - BIT= 0 - (CL) NO ROOM FOR ATTEMPTED CHARACTER SET LOAD.  
1 - (FL) NO ROOM FOR ATTEMPTED FORM LOAD.  
2 - (VL) NO ROOM FOR ATTEMPTED VFC LOAD.  
3 - (CU) ATTEMPT TO PRINT DATA AND THERE IS NO CURRENTLY  
SELECTED CHARACTER SET.  
4 - (FU) ATTEMPT TO SELECT AN UNDEFINED FORM SET.  
5 - (VU) ATTEMPT TO PRINT DATA AND THERE IS NO CURRENTLY  
SELECTED VFC SET.  
6 - (IL) ATTEMPT TO PRINT DATA AND THERE IS NO CURRENTLY  
SELECTED LOGICAL PAGE TABLE (LPT) ENTRY.  
7 - (IP) ATTEMPT TO MOVE PEN OFF THE LOGICAL PAGE.  
8 - (ST) THE 2680A COULD NOT PROCESS ALL OF THE DATA  
BEFORE IT WAS SUPPOSED TO BE TRANSFERRED TO THE  
DRUM/PAPER. DATA WAS LOST!  
9 - (SB) SPOOLER BLOCK CONTAINS FORMAT ERROR.  
10 - (IR) INVALID RECOVERY BLOCK RECEIVED FROM SPOOLER.  
11 - (MP) MAXIMUM NUMBER OF COPIES PER PHYSICAL PAGE  
HAS BEEN EXCEEDED. THIS IS A RESULT OF THE  
SPOOLER PROCESS SETTING THE MAXIMUM COPIES PER  
PAGE WITH FUNCTION CODE 132.  
12 - (NJ) A COMMAND OR FUNCTION CODE WAS RECEIVED WHEN NO  
"JOB" WAS IN PROGRESS. THE COMMAND OR FUNCTION WAS  
IGNORED BY THE DCS.  
13 - (NM) NO MEMORY. 2680A DYNAMIC MEMORY ALLOCATION HAS  
DETECTED THAT MAIN MEMORY IS COMPLETELY OCCUPIED WITH  
CHARACTER SETS, VFC'S, FORMS AND DATA SUCH THAT THE  
2680A CANNOT PROCESS THE CURRENT INPUT DATA. DATA  
WILL BE LOST!  
14 - (TL) ATTEMPT TO PRINT DATA AND THERE ARE MORE THAN  
THE MAXIMUM ALLOWABLE LOGICAL PAGE TABLE (LPT)  
ENTRIES SELECTED.  
15 - (NC) A NON-EXISTENT VFC CHANNEL WAS SKIPPED TO.

- WORD 5 - BIT= 0 - (LP) LOGICAL PAGE TRUNCATED TO FIT PHYSICAL PAGE.  
1 - (PF) PAGE SIZE PEQUIRED BY PROGRAMMER DID NOT  
MATCH PAGE SIZE SET BY OPERATOR. OPERATOR PAGE  
SIZE PREVAILS.  
2 - (NC) NO CHARACTER SET SELECTED.

WORDS 6/11 NOT USED BUT RESERVED FOR FUTURE USE.

WORDS 12/13 - THE RECORD NUMBER WHICH CONTAINS THE OFFENDING ERROR  
AS DEFINED BY WORD FOUR. IF A POWER FAIL OCCURS DURING  
A "JOB", THE POWER FAIL BIT IS SET AND A SHEET NUMBER IS  
MADE AVAILABLE IN WORDS FOURTEEN AND FIFTEEN. HOWEVER,  
THE RECORD NUMBER IS LOST AND CANNOT BE REPORTED. THESE  
WORDS OCCUR IN A "JOB" ONLY.

WORDS 14/15 - THE SHEET NUMBER ON WHICH THE ERROR OCCURED AS DEFINED  
BY WORD FOUR. IF AN ERROR OCCURS IN THE ENVIRONMENT FILE  
AT THE START OF A "JOB", THEN THIS NUMBER WILL BE ZERO.  
IN ADDITION, WHEN A POWER FAIL OCCURS DURING A "JOB",  
THE POWER ON BIT IS SET IN WORD ONE AND THE SHEET  
NUMBER OF THE LAST SUCCESSFULLY TRANSFERRED PAGE IS  
PLACED HERE. THIS INFORMATION IS FOR USE BY THE

SPOOLER SHOULD A RECOVERY OF A "JOB" BE DETERMINED.  
THESE WORDS OCCUR IN "JOB" ONLY.

ALL WORDS OF THE I/O STATUS ARE CLEARED WHENEVER THE STATUS BLOCK  
IS RETURNED TO THE HOST. IT IS UP TO THE HOST CPU TO RETAIN ANY ON-  
GOING STATUS BITS REQUIRED.

# 30119 CARD READER/PUNCH DIT

Everything is the same as the SIO DIT  
and standard IOQ except as noted below:

## 1. DIT (9)

|     | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12,13 | 14 | 15 |       |
|-----|---|---|---|---|---|---|---|---|---|---|----|----|-------|----|----|-------|
| %11 | C | S | S | H | I | E | I | P | P | S | E  | S  | M     | C  | T  |       |
|     | B |   |   |   | I | O |   |   |   | P |    |    | O     | O  |    | DACCP |
|     | F | C | S | S | F | F | B | R | N | D | C  | m  | D     | N  | R  |       |
|     |   |   |   |   |   |   |   |   |   |   |    |    | E     |    |    |       |

|               |     |                                                                                                                                                             |
|---------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DIT(9).(0:1)  | CBF | Clear Buffer Full - 0= the next card leaving the hopper will be read by the device.<br>1= the read buffer will be cleared when next card leaves the hopper. |
| DIT(9).(1:1)  | SC  | Stacker Control - 0=all cards are stacked in right hopper until device goes not ready.<br>1= cards are stacked per bit 2.                                   |
| DIT(9).(2:1)  | SS  | Stacker Select - 0=Right stacker (stacker 1)<br>1= Left Stacker (stacker 2).                                                                                |
| DIT(9).(3:1)  | HS  | Hopper Select - 0= Pick from rear hopper (primary hopper). 1= Pick from front hopper (secondary hopper).                                                    |
| DIT(9).(4:1)  | IIF | Inhibit Input Feed - Inhibit picking a card when card currently in wait station is eject to a hopper.                                                       |
| DIT(9).(5:1)  | EOF | End Of File has been detected on a read oper                                                                                                                |
| DIT(9).(6:1)  | IB  | Internal Buffer -An internal buffer is being used. The buffer is the SIO area in the ILT.                                                                   |
| DIT(9).(7:1)  | PR  | Print - Print on the next card to pass the print station.                                                                                                   |
| DIT(9).(8:1)  | PN  | Punch - Punch 80 columns of data on the next card to pass the punch station.                                                                                |
| DIT(9).(9:1)  | SPD | Separate Print Data - Print data other than that being punched on the next card to pass the punch and print station.                                        |
| DIT(9).(10:1) | EC  | Eject Card - Eject on a write after a read. Used when reading one card then punching one card (last card was read).                                         |

# 30119 CARD READER/PUNCH (CONT.)

DIT(9).(11:1)      Sm      Stacker Mode -Saved staker mode on last read

DIT(9).(12:2)      MODE      Access Mode -  
                                  0= File opened for Read only  
                                  1= File opened for Write only  
                                  2= File opened for Read/Write

DIT(9).(14:1)      CON      Control - 0= no FCONTRL has occurred for this  
                                  file (use default settings). 1= FCONTROL has  
                                  been done on this file (use settings in this  
                                  DIT word for controlling this device).

DIT(9).(15:1)      TR      Timer Request - A timer request is pending.  
                                  Timer request index is in word %12.

2. DIT(10) Timer request index (see DIT(9).(15:1)).

## 3. QMISC{IOQ(4)}

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| I | N | W |   |   |   |   |   |   |   |    |    |    |    |    |    |
|   | R |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| O | I | R |   |   |   |   |   |   |   |    |    |    |    |    |    |

IOQ(4).(0:1)      IO      I/O initiated - waiting for completion  
                                  interrupt.

IOQ(4).(1:1)      NRI      Waiting for a "Not Ready Interrupt" to  
                                  bring the device back online.

IOQ(4).(2:1)      WR      Write - current operation is a write  
                                  operation.

IOQ(4).(3:13)      Not Used

# BINARY SYNCHRONOUS COMMUNICATION FOR CS DIT

| 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
|---------------------------------------|------------------------|----|-----------|----|-------|------|-----|------------|--------|------|----|--|------|--|---------------------------------|
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 0                                     | AC                     |    | TV        |    | SI    |      | IN  |            | DR     |      | ON |  | V-LI |  | 0                               |
|                                       |                        |    |           |    | O-T   |      |     |            | EN     |      | NE |  |      |  | INT-AC=INTERRUPT<br>ACKNOWLEDGE |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 1                                     | NEXT DITP              |    |           |    |       |      |     |            |        |      |    |  |      |  | 1                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 2                                     | IOQP                   |    |           |    |       |      |     |            |        |      |    |  |      |  | 2                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 3                                     | UNIT                   |    |           |    |       |      |     |            | DLDEVN |      |    |  |      |  | 3                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 4                                     | DLTP                   |    |           |    |       |      |     |            |        |      |    |  |      |  | 4                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 5                                     | ILTP                   |    |           |    |       |      |     |            |        |      |    |  |      |  | 5                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 6                                     | TO                     |    | LO        |    | C-    |      | TO  |            |        |      |    |  |      |  | 6                               |
|                                       |                        |    |           |    |       |      |     |            |        |      |    |  |      |  | TO=TIMEOUT<br>LOC=LOCAL         |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 7                                     | HARDWARE STATUS        |    |           |    |       |      |     |            |        |      |    |  |      |  | 7                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 10                                    | RESERVED               |    |           |    |       |      |     |            |        |      |    |  |      |  | 8                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 11                                    | CONTROL P              |    |           |    |       |      |     |            |        |      |    |  |      |  | 9                               |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 12                                    | LCM' DITP              |    |           |    |       |      |     |            |        |      |    |  |      |  | 10                              |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 13                                    | EDIT' DITP             |    |           |    |       |      |     |            |        |      |    |  |      |  | 11                              |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| 14                                    | PD' DITP               |    |           |    |       |      |     |            |        |      |    |  |      |  | 12                              |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (0)15                                 | CM                     | PW | HD        | SF | TO    | BF   | ID  | US         | LO     |      |    |  |      |  |                                 |
|                                       | P-                     | R- | AB        | AB |       | FZ   | FZ  | ER         | C-     |      |    |  |      |  |                                 |
|                                       | IN                     | FL | T         | T  |       |      |     | RQ         | TO     |      |    |  |      |  |                                 |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (1)16                                 | CM                     | PW | HD        | SF | TO    | BF   | ID  | US         | LO     |      |    |  |      |  |                                 |
|                                       | P-                     | R- | AB        | AB |       | FZ   | FZ  | ER         | C-     |      |    |  |      |  |                                 |
|                                       | IN                     | FL | T         | T  |       |      |     | RQ         | TO     |      |    |  |      |  |                                 |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (2)17                                 | SUBTYPE                |    | DEV. TYPE |    |       |      | LCN |            |        |      |    |  |      |  | 15(2) LINE INFO                 |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (3)20                                 | TRANSFER LENGTH        |    |           |    |       |      |     |            |        |      |    |  |      |  | 16(3)                           |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (4)21                                 | LAST RECOVERABLE ERROR |    |           |    |       |      |     | ERROR CODE |        |      |    |  |      |  | 17(4)                           |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (5)22                                 | WAIT QUEUE             |    |           |    |       |      |     |            |        |      |    |  |      |  | 18(5)                           |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |
| (6)23                                 | IN                     | IN | TR        | IN | SPEED | CS   |     |            |        | CS   |    |  |      |  |                                 |
|                                       | H-                     | H- | C-        | H- | SELEC | MODE |     |            |        | CODE |    |  |      |  |                                 |
|                                       | TO                     | ID | SP        | CL |       |      |     |            |        |      |    |  |      |  |                                 |
| -----                                 |                        |    |           |    |       |      |     |            |        |      |    |  |      |  |                                 |

1999 2000 2001 2002 2003 2004

13-80

## CS DIT (CONT.)

|        |                                    |                         |                                                                |
|--------|------------------------------------|-------------------------|----------------------------------------------------------------|
| (30)45 | # MESSAGES RECV'D                  |                         | 37(24)                                                         |
| (31)46 |                                    |                         | 38(25)                                                         |
| -----  |                                    |                         |                                                                |
| (32)47 | RECOVERABLE ERRORS                 |                         | 39(26)                                                         |
| (33)50 | IRRECOVERABLE ERRORS               |                         | 40(27)                                                         |
| (34)51 | COMPLETION CODE                    | TIMEOUT CODE            | 41(28)                                                         |
| (35)52 | LOCAL TRLX TIMEOUT                 |                         | 42(29)                                                         |
| (36)53 | TIMEOUT TRLX                       |                         | 43(30)                                                         |
|        | (1 2 8)                            |                         |                                                                |
| (37)54 | TR TR <br>AL WR                    | TRACE MASK<br> DR       | TRWR=TRACEWRAP<br>TRAL=TRACE ALL<br>44(31)TRDR=TRACE<br>DRIVER |
| (40)55 | MAX ENTRYS                         | CURRENT RETRYS          | 45(32)                                                         |
| (41)56 | LINE STATE                         |                         | 46(33)                                                         |
| (42)57 | XMSN LOG                           |                         | 47(34)                                                         |
| (43)60 | CTS DELAY                          | PREEMP ERROR            | 48(35)                                                         |
| (44)61 |                                    |                         | 49(36) DRIVER                                                  |
| (45)62 | CNTRLSEQ                           |                         | 50(37) PARM1                                                   |
| (49)63 | TIMEOUT                            |                         | 51(38) DRIVER                                                  |
| (47)64 | VALUE                              |                         | 52(39) PARM2                                                   |
| (50)65 | OUTPUT BUFFER BANK                 |                         | 53(40) DRIVER                                                  |
| (51)66 | OUTPUT BUFFER                      |                         | 54(41) PARM3                                                   |
| (52)67 | OUTPUT BUFFER LENGTH               |                         | 55(42) DRIVER                                                  |
| (53)70 | INPUT BUFFER BANK                  |                         | 56(43) PARM4                                                   |
| (54)71 | INPUT BUFFER                       |                         | 57(44) DRIVER                                                  |
| (55)72 | INPUT BUFFER LENGTH                |                         | 58(45) PARM 5                                                  |
|        | (0 1 2 6 7 8)                      |                         |                                                                |
| (56)73 | TR TR TR <br>CE CC CF <br>RR OM LH | IN DS <br>& R <br>PL DL | RESPONSE<br>TIMEOUT<br>54(46)                                  |
| (57)74 | BID TIMEOUT                        |                         | 60(47)                                                         |



CS DIT (CONT.)

|         |                                        |                      |        |
|---------|----------------------------------------|----------------------|--------|
| (60)75  | (0   4<br>PO  <br>LC  <br>HG           | BLOCK SIZE           | 61(48) |
| (61)76  |                                        | SEND MFW             | 62(49) |
| (62)77  |                                        | AGGREGATE XLOG       | 63(50) |
| (63)100 | (   8<br>REQ STATION   CURRENT STATION |                      | 64(51) |
| (64)101 | # POLL ENTRIES   POLL LIST INDEX       |                      | 65(52) |
| (65)102 |                                        | TRACE IOQ            | 66(53) |
| (66)103 |                                        | POLL ENTRY DELAY     | 67(54) |
| (67)104 |                                        | POLL REPEAT          | 68(55) |
| (70)105 |                                        | POLL LOOP DELAY      | 69(56) |
| (71)106 |                                        | CONFIG BUFFER SIZE   | 70(57) |
| (72)107 |                                        | REQUEST IOQ          | 71(58) |
| (73)110 |                                        | HARD ABORT IOQ       | 72(54) |
| (74)111 |                                        | SOFT ABORT IOQ       | 73(60) |
| (75)112 |                                        | RETRANSMISSIONS      | 74(61) |
| (76)113 |                                        | # RESPONSE TIMEOUTS  | 75(62) |
| (77)114 |                                        | # BCC ERRORS         | 76(63) |
| 100)115 |                                        | # RECV TIMEOUTS      | 77(64) |
| 101)116 |                                        | # OVERRUNS           | 78(65) |
| 102)117 |                                        | PREVIOUS RECOV ERROR | 79(66) |
| 103)120 |                                        | BUF 1 BYTES LEFT     | 80(67) |
| 104)121 |                                        | BUF 2 BYTES RIGHT    | 81(68) |
| 105)122 |                                        | RECV MFW             | 82(69) |

|                                                                    |    |    |    |  |    |    |    |  |    |    |    |                   |
|--------------------------------------------------------------------|----|----|----|--|----|----|----|--|----|----|----|-------------------|
| <p>LINE CONTROL MONITOR (LCM)<br/>SECTION OF THE DIT</p>           |    |    |    |  |    |    |    |  |    |    |    |                   |
| (0                                                                 | 1  | 2  | 3  |  | 6  | 7  | 8  |  | 10 | 11 | 12 | )                 |
| RC                                                                 | SE | RE | RE |  | SD | RD | RD |  | DW | SV | TE |                   |
| AK                                                                 | AK | SP | SP |  | WA | RE | IN |  | N  | AB | XT |                   |
| CT                                                                 | CT | TO | FG |  | CK | PT | TR |  | LD | RT |    |                   |
|                                                                    |    |    |    |  |    |    |    |  |    |    |    | LCMP(0) LCMPFLAGS |
| USER REQUEST                                                       |    |    |    |  |    |    |    |  |    |    |    | LCMP(1)           |
| CURRENT STATE                                                      |    |    |    |  |    |    |    |  |    |    |    | LCMP(2)           |
| TRACE STATE                                                        |    |    |    |  |    |    |    |  |    |    |    | LCMP(3)           |
| MRJE BUF 0                                                         |    |    |    |  |    |    |    |  |    |    |    | LCMP(4)           |
| MRJE BUF 1                                                         |    |    |    |  |    |    |    |  |    |    |    | LCMP(5)           |
| MRJE BUF 2                                                         |    |    |    |  |    |    |    |  |    |    |    | LCMP(6)           |
| LCM BUFFER (8 words)                                               |    |    |    |  |    |    |    |  |    |    |    | LCMP(7)-LCMP(14)  |
| <p>EDITOR SECTION<br/>OF THE DIT<br/>(DRIVER DEFINED)</p>          |    |    |    |  |    |    |    |  |    |    |    |                   |
| <p>PHYSICAL DRIVER<br/>SECTION OF THE DIT<br/>(DRIVER DEFINED)</p> |    |    |    |  |    |    |    |  |    |    |    |                   |

-----

## CS DIT FIELDS AND DEFINITIONS

MASK and FLAG  
Words 13 and 14

|         |                      |
|---------|----------------------|
| CMP-IN  | Completion Interrupt |
| PWR-FL  | Power Fail           |
| HD-ABT  | Hard Abort           |
| SF-ABT  | Soft Abort           |
| TO      | Timeout              |
| BF FZ   | Buffer Frozen        |
| ID FZ   | ID Frozen            |
| USER RQ | User Request         |
| LOC-TO  | Local Timeout        |

COPTIONS  
Word 19

|        |                 |
|--------|-----------------|
| INH-TO | Inhibit Timeout |
| INH-ID | Inhibit ID      |
| TRC-SP | CS Trace        |
| INH-CL | Inhibit :CLINE  |

AOPTIONS  
Word 20

|        |                            |
|--------|----------------------------|
| INH-BF | Inhibit Buffering Override |
| CON-IO | Concurrent IO              |

DOPTIONS  
Word 21

|           |                           |
|-----------|---------------------------|
| REM-WT    | Delay Sequence Wait       |
| NO-RVI    | Poll Termination Sequence |
| DSB-CT    | Disable Control Read      |
| END-SEQN  | Ending Sequence           |
| LD-GPH    | Leading Graphics          |
| AS-BCC    | Value of US ASCII BCC     |
| DB WK     | Disable WACK              |
| DB-TTD    | Disable TTD               |
| EX ITB    | Expect ITB                |
| MWF TYPE  | Message Format Word       |
| CHA-WR    | Chain Writes              |
| NUM-SYNCS | Number of Leading SYNCs   |

MISC  
Word 22

|           |                   |
|-----------|-------------------|
| CODE SN   | Code Sensing      |
| ABT-AK    | Abort ACK         |
| DUAL SP   | Dual Speed        |
| HALF SP   | Half Speed        |
| XMSN MODE | Transmission Mode |
| SPD-CH    | Speed Changeable  |

# CS DIT (CONT.)

-----

## DST INFO

Word 23

ID PRES

ID Present

## FLAGS

Word 31

REQ USD  
RECV ER  
TR COMP  
TR PDRV  
IN HNDL  
DIRT BF  
ID BITS  
ID FRZN  
ID ERR  
1ST IN  
2ND IN  
MSTA TR  
ABT LAT  
FIND ID  
PAD ADD  
AB POLL

Request Used  
Recoverable Error  
Trace Out Completion  
Trace Out Physical Driver  
Interrupt Handler  
Dirty Buffer  
ID Frozen Bits  
ID Frozen  
ID MAM Error  
First Interrupt  
Second Interrupt  
MMSTAT Trace  
Abort Later  
Find Station ID  
Pad Added  
Abort Poll

## STANDARD (46)

Word 54

TRC ERR  
TRC COM  
TRC FLH  
IN & PL  
DSR DL

Trace Error Toggle  
Trace Complete  
Trace Flush  
Increment and Poll  
Date Set Ready Delay

## LCMFLAGS

LCMP(0)

RC AKCT  
SE AK CT  
RESP TO  
RESP FG  
SD WACK  
RD REPT  
RD INTR  
DWN LD  
SV ABRT  
TEXT

Received ACK Counter  
Send ACK Counter  
Response Timeout  
Response Flag  
Send WACK  
Read Repeat  
Read Interrupt  
Download  
Save Abort  
Text

# MULTIPOINT TERMINAL DEVICE INFORMATION TABLE

| 0  | 1  | 2  | 3  | 4  | 5  | 6    | 7  | 8  | 9  | 10  | 11  | 12    | 13  | 14  | 15 |           |
|----|----|----|----|----|----|------|----|----|----|-----|-----|-------|-----|-----|----|-----------|
| 0  | 0  | AC | RQ | 0  | 0  | PM   | 0  | IA | 0  | 0   | 0   | STATE |     |     |    | 0 DFLAG   |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 1 DLINK   |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 2 DIOQP   |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 3 DLDEVT  |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 4 DDLTP   |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 5 DILTP   |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 6         |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 7         |
| RT | LG |    |    |    |    |      |    |    | 0  |     |     |       |     |     |    | 8 DTIME   |
| GS | RE | CR | FC | MR | WP | RP   | DR | UP | PS | RTR | TIM | BR    | SSR | FLU | LP | 9 DMISCT  |
| LG | TY | WA | RJ | DW | DR | UR   | 0  |    |    |     |     |       |     |     |    | 10 DLDEVL |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 11 DDSBUF |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 12 DWLIM  |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 13 DFRMAT |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 14 DNEXT  |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 15 DNWRT  |
| LF | DR | EM | AT | SM | WQ | DJST |    |    |    |     |     |       |     |     |    | 16 DSTA   |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 17 DFIRST |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 18 DBCNT  |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 19 DTIND  |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 20 DRTMD  |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 21        |
|    |    |    |    |    |    |      |    |    |    |     |     |       |     |     |    | 22 DRTMAX |

# MULTIPOINT TERMINAL DEVICE INFORMATION TABLE (cont)

|                                                   |   |   |   |   |   |   |   |            |   |       |    |    |          |    |           |  |
|---------------------------------------------------|---|---|---|---|---|---|---|------------|---|-------|----|----|----------|----|-----------|--|
| 0                                                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8          | 9 | 10    | 11 | 12 | 13       | 14 | 15        |  |
| TERMINALTYPE                                      |   |   |   |   |   |   |   | 0          |   | SPEED |    |    |          |    | 23 DTYPE  |  |
| LOGICAL/PHYSICAL WRITE COUNTER                    |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 24 DWCNT  |  |
| HOLDS UNEDITED MODE CHARS, WHILE IN BREAK MODE    |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 25 DBUNM  |  |
| DSTN OF DATA SEGMENT HOLDING "HELLO" MESSAGE      |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 26 DDSHEL |  |
| BYTE COUNT FOR "HELLO MESSAGE"                    |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 27 DHBCNT |  |
| POINTER TO NEXT DIT IN WACK Q                     |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 28 DWACK  |  |
| POINTER TO NEXT DIT IN REJECT Q                   |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 29 DREJT  |  |
| CURRENT VERSION NO. OF IOMPTRM0 (MODULE 1)        |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 30 DMOD   |  |
| ATTENCHAR                                         |   |   |   |   |   |   |   | ENDCHAR    |   |       |    |    | 31 DUNMD |    |           |  |
| DSTN OF SECONDARY TERMINAL BUFFER                 |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 32 DDSB2  |  |
| BYTE COUNT (READS), BUFFER LENGTH (WACK or reject |   |   |   |   |   |   |   |            |   |       |    |    |          |    | 33 DBCNT  |  |
| RESERVED                                          |   |   |   |   |   |   |   | GROUPINDIT |   |       |    |    | 34 DGRP  |    |           |  |

MULTIPOINT TERMINAL DIT (CONT)

-----

DFLAG - Flags and SIODM state.

.ACTIVE - SIODM is currently active servicing this device.

.REQUEST - Service for this device was requested while SIODM was active.

.PREMPT - Peemptive request flag.

.IAK - Response has occurred (interrupt acknowledge flag).

.STATE - SIODM state.

DLINK - SYSDB relative pointer to the DIT for the next device requesting service or this resource.

DIOQP - SYSDB relative pointer to the DIT for the next device requesting service or this resource.

DLDEVT - Logical device number and unit number.

.LDEVNT - Logical device number of the multipoint terminal.

.UNIT - Unit number representing terminal address (group and device ID).

DDLTP - SYSDB relative pointer to Driver Linkage Table (DLT).

DILTTP - SYSDB relative pointer to dummy Interrupt Linkage Table (ILT) to satisfy SIODM requirements (no real ILT is associated with multipoint terminals).

DTIME - Timer flags.

.READTOF - Read timeout has occurred.

.LOGONTOF - Log on timeout has occurred.

DMISCT - Miscellaneous flags.

.GSIN - Last character received from the terminal was the GS character.

.READEROR - Read error has occurred.

.CRITICAL - If set, IOMPTRMO will not attempt to release extra data segments previously acquired by MPMON

## MULTIPOINT TERMINAL DIT (CONT)

-----

- .FILTERCRLFOK - Proper editing of input data with respect to CR and LF characters has already been made.
- .MARKED - This DITT has already been processed during construction of SUPLIST.
- .WPOSTP - Current write request has been postponed.
- .READPEND - Read request is pending against this terminal.
- .DATAREADY - Input data has been received and is ready in the terminal read buffer.
- .UP - Device has been initialized through the log on procedure or has been allocated.
- .PRESPACEF - Last write operation was with a prespace request. If the next write operation is with a post space request, output CR and LF before data.
- .READTIMERF - Read timing requested and not yet in progress.
- .TIMING - Current read request is being timed.
- .BRKOK - System break is enabled.
- .SSBRKOK - Subsystem break is enabled.
- .FLUSH - This flag is set whenever break has been detected and accepted. While it is set, writes are returned completed without any I/O being done. Reads are returned with an unusual condition status %173. It also holds off any further break service requests. It is reset with a function code 25 operation.
- .LASTPREMEPT - Last request was a preemptive request.

### DLDEVL

- . LOGONTYPE - 0: JOB  
                  1: SESSION  
                  2: DATA
- . WACK - If set then WACK or EOT condition has been detected and the terminal was placed in the WACK queue.



# MULTIPOINT TERMINAL DIT (CONT)

-----

- . REJECT - If set then a terminal error has been detected and the terminal was placed in the REJECT queue.
- . DOWN - If set then this terminal was declared down through the console operator command or the configuration file.
- . DOWNREQ - If set then a request is pending to declare the terminal down.
- . UPREQ - If set then a request is pending to declare the terminal up.

.LDEVNL - Logical device number of the controller servicing the multipoint line.

DDSBUF - Data segment number of the terminal read buffer.

DWLIM - Write limit counter.

## DFORMAT

.FORMATF - This field holds information about vertical format specification for writes obtained from P1 parameter of the IOQ element or from the first data byte.

DNEXT - SYSDB relative pointer to the DITT for the next terminal on the same line.

DNWRITE - SYSDB relative pointer to the DITT for the next terminal with postponed write.

DSTATION - Flags and station number.

.LFLUSH - This flag is set to indicate that data for this terminal already scheduled to be written from the output buffer should not be physically sent to the terminal (break or subsystem break environment).

## MULTIPOINT TERMINAL DIT (CONT)

- 
- .DISCONREQ - Request to disconnect the terminal.
  - .BREAKMODE - Terminal is in break mode.
  - .ATTENTERM - Terminal is in attention mode.
  - .SSEMODE - Terminal is in subsystem break mode.
  - .WLQUEUE - A write request was forced to be queued by MPE I/O system.
  - .DJSTATE - State of terminal straps D and J.
    - 0 - Initial state.
    - 1 - Straps D and J are open or will be open before the next write.
    - 2 - Undefined D and J setting.
  - .STATIONINDIT - Station number assigned to this terminal by CS.
  - DFIRST - Storage for first word for ASCII writes if vertical format is specified by first data byte.
  - DBCNT - Actual byte count for reads.
  - DTIND - Timer indexes.
    - .READTINDEXF - Read timer index.
    - .LOGONTINDEXF - Log on timer index.
  - DRTIME (DRTIMED) - During a timed read, this is the reading of the timer at the initiation of the read. After a timed read is completed, the time in 1/100 of a second is saved in DRTIME as a single word. If it is -1 then the time was greater than 32K.
  - DRTMAX - When a read operation timeout is requested, this quantity represents the maximum time in seconds allowed for the read to be completed.

MULTIPOINT TERMINAL DIT (CONT)

-----

DTYPE - Terminal type and speed.

.TERMINALTYPE - Configured terminal type. Multipoint terminal is type 14.

.SPEED - Reserved field for configured terminal speed (not used for multipoint terminals).

DWCNT - Logical/physical write counter.

DBUNMODE - Holds unedited mode characters while in break mode.

DDSHL - DST number of data segment holding "HELLO" message (or backspaced data).

DHBCNT - Byte count for "HELLO" message (or backspaced data).

DWACK - Pointer to next DIT in WACK queue.

DREJECT - Pointer to next DIT in REJECT queue.

DMODIVER - Current version number of the multipoint terminal driver (IOMPTRMO).

DUNMODE - Unedited mode characters.

.ATTENCHAR - Attention character.

.ENDCHAR - End-of-character. (Effective as a control character is set to %137, otherwise not used).

DDSBUF2 - Data segment number of secondary read buffer.

DBCNT2 - Byte count for read if secondary read buffer is used

DGROUP

GROUPINDIT - Logical group number assigned to this terminal by CS.

# MULTIPOINT SUPERVISOR DEVICE INFORMATION TABLE (DITS)

| 0  | 1  | 2  | 3  | 4    | 5  | 6        | 7  | 8        | 9  | 10 | 11 | 12     | 13 | 14 | 15 |           |
|----|----|----|----|------|----|----------|----|----------|----|----|----|--------|----|----|----|-----------|
| 0  | 0  | AC | RQ | 0    | 0  | PR       | 0  | IA       | 0  | 0  | 0  | STATE  |    |    |    | 0 DFLAG   |
|    |    |    |    |      |    | NEXT     |    | DITP     |    |    |    |        |    |    |    | 1 DLINK   |
|    |    |    |    |      |    |          |    | IOQP     |    |    |    |        |    |    |    | 2 DIOQP   |
|    |    |    |    | UNIT |    |          |    |          |    |    |    | LDEVNS |    |    |    | 3 DLDEVS  |
|    |    |    |    |      |    |          |    | DLTP     |    |    |    |        |    |    |    | 4 DDLTP   |
|    |    |    |    |      |    |          |    | ILTP     |    |    |    |        |    |    |    | 5 DILTP   |
|    |    |    |    |      |    |          |    | RESERVED |    |    |    |        |    |    |    | 6         |
|    |    |    |    |      |    |          |    | RESERVED |    |    |    |        |    |    |    | 7         |
| WA | RJ |    |    |      |    |          |    | 0        |    |    |    |        |    |    |    | 8 DTIME   |
| MP | DU | DE | TO | TOR  | TR | SN       | SR | BH       | MA | MU | GP | GD     | GW | GR | CR | 9 DMISCS  |
|    |    |    |    |      |    | RESERVED |    |          |    |    |    | LDEVNL |    |    |    | 10 DLDEVL |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 11 DDITSP |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 12 DTBOFF |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 13 DWLCON |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 14 DNEXT  |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 15 DNWRIT |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 16 DMOD2V |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 17 DINBA  |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 18 DOUTBA |
|    |    |    |    |      |    |          |    |          |    |    |    |        |    |    |    | 19 DOSPD  |

MULTIPOINT SUPERVISOR DIT (CONT)

|                                                       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
|-------------------------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|-----------|
| 0                                                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |           |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| INDEX OF HEAD ENTRY IN LINE WRITE BUFFER              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 20 DHEADI |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| INDEX OF TAIL ENTRY IN LINE WRITE BUFFER              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 21 DTAILI |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| INDEX OF LAST AVAILABLE WORD IN LINE WRITE BUFFER     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 22 DENDI  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| TERMINAL TYPE      SP DO ID              SPEED        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 23 DTYPE  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| CURRENT VERSION NO. OF MPMONCMD (Module 3)            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 24 DMOD3V |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| DSTN OF MPMON     STACK                               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 25 DMDSTN |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| LINE SPEED     - 1st WORD                             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 26        |
| DLSPEED                                               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| LINE SPEED     - 2nd         WORD                     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 27        |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| POINTER TO FIRST DIT IN WACK Q                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 28 DWACK  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| POINTER TO FIRST DIT IN REJECT Q                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 29 DREJ   |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| WACKTINDEX                       REJECTTINDEX         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 30 DWRTI  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| CFCHAR0                       CFCHAR1                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 31 DCF01  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| CFCHAR2                       CFCHAR3                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 32 DCF23  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| CFCHAR 4                       CFCHAR5                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 33 DCF45  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| CFCHAR6                       CFCHAR7                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 34 DCF67  |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |
| RO UDR FB CD FS              0              MM  UD MO |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 35        |
| -----                                                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |           |

## MULTIPOINT SUPERVISOR DIT (CONT)

DFLAG -

DLINK - Same as for DITT

DIOQP -

DLDEVS - Logical device number and unit number.

.LDEVNS - Logical device number of the Multipoint Supervisor.

.UNIT - Unit number (always 0).

DDLTP - Same as for DITT

DILTP

DTIME -

.WACKTO If set, then WACK timeout has expired

.REJECTIO If set, then REJECT timeout expired.

DMISCS - Miscellaneous flags.

.MPOK - If set, then IOMPSO is allowed to process I/O requests against the Multipoint Supervisor.

.DEBUGON - If set, then DEBUG will be called from MPMON. This flag is set through the MPLINE command.

.TRACEON - Trace facility is enabled.

.TRACEOFFREQ - Trace facility is to be disabled.

.TRACEONREQ - Trace facility is to be enabled.

.SHUTNOW - Request to shut the line immediately.

.SHUTREQ - Request to shut line after all terminals are released  
New sessions are not allowed to be initiated.

.BUSYHEAD - The line write buffer contains data to be written to a terminal on the line.

# MULTIPOINT SUPERVISOR DIT (CONT)

-----

- .MPONACT - MPMON process is active.
- .MEMONUP - MPMON process has been created and activated.
- .GENWPOSTP - A write request for one or more terminals on the line has been postponed.
- .GENDISCON - Request to disconnect the line.
- .GENWACK - If set then there is a terminal in the WACK queue.
- .GENREJECT - If set then there is a terminal in the REJECT queue.
- .COMPLREQ - Request to complete dummy read pending against the Multipoint Supervisor.

## DLDEVL

- .LDEVNL - Logical device number of the controller servicing the multipoint line.
- DDITSP - SYSDB relative pointer to the DIT for the Multipoint Supervisor (DITS).
- DTBUFOFFS - Offset to the trace buffer in MPMON stack.
- DWLCON - Write limit constant.
- DNEXT - SYSDB relative pointer to the DITT for the first terminal on the line (the terminal with the lowest logical device number).
- DNWRITE - SYSDB relative pointer to the DITT for the first terminal with postponed write.
- DMOD2VER - Current version number of the Multipoint Supervisor driver (IOMPSO).
- DINBUFA - Address of the line read buffer in MPMON stack.
- DOUDBUFA - Address of the line write buffer in MPMON stack.
- DOSPEED - Output speed.
- DHEADI - Index of head entry in the line write buffer.
- DTAILI - Index of tail entry in the line write buffer.

## MULTIPOINT SUPERVISOR DIT (CONT)

-----

DENDI - Index of last available word in the line write buffer.

### DTYPE

.TERMINALTYPE - Configured terminal type. Multipoint Supervisor is type 14 (same type as multipoint terminals).

.SUPER - This device is a Multipoint Supervisor.

.DITSOK - DIT's for the multipoint terminals and the Multipoint Supervisor on this line have been rearranged and their format corresponds to standard DIT format for SIO devices.

.SPEED - Reserved field for configured terminal speed (not used for Multipoint Supervisor).

.INITDONE - If set then all multipoint terminals belonging to the same multipoint supervisor have been linked.

DMOD3VER - Current version number of the MPLINE command processor (MPMONCMD).

DMONDSIN - Data segment number of MPMON stack.

DLSPEED (DLSPEEDD) - If not equal to 0, then the line is opened with speed specified in this double word.

DWACK - Pointer to the first terminal DIT in the WACK queue.

DREJECT - Pointer to the first terminal DIT in the REJECT queue.

### DWRT1

.WACKINDEX - WACK timer index.

.REJECTINDEX - REJECT timer index.

DCF01 through DCF67 - String of characters representing:

- a) the name of the configuration file, or
- b) the logical device number of the terminal, or
- c) terminal group and device ID.

### DCONFL

.REOPEN - If set then a request for line reopening has been made.

.UPDOWNREQ - If set then a request to set the terminal UP or DOWN has been made.

.FORCE'SHUT - If set then a request has been made to shut the line immediately.



MULTIPOINT SUPERVISOR DIT (CONT.)

-----

- .UP'DOWN - If true then the terminal is to be set UP else the terminal is to be set DOWN. This flag is used in conjunction with .UPDOWNREQ flag.
- .MSGOFF - If set then certain MTS messages are not displayed on the operator console.

# INP DIT

|      | 0  | 1  | 2  | 3  | 4       | 5  | 6  | 7  | 8  | 9        | 10      | 11 | 12 | 13 | 14 | 15 |           |
|------|----|----|----|----|---------|----|----|----|----|----------|---------|----|----|----|----|----|-----------|
| DIT0 | 0  | AC | RQ | TI | 0       | PR | IO | IN | SM | MAMSTATE | IOSTATE |    |    |    |    |    | DFLAG     |
| 1    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DLINK     |
| 2    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DIOQP     |
| 3    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DLDEV     |
| 4    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DDLTP     |
| 5    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DILTP     |
| 6    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DSTATUS   |
| 7    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DTRLX     |
| 8    | TO |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DTIME     |
| 9    |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | READYQ    |
| 10   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | READYQTL  |
| 11   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | ACTIVEQ   |
| 12   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | ACTIVEQTL |
| 13   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | WAITEDQ   |
| 14   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    |           |
| 15   | EO | WP | TR |    | PFSTATE | UF | PR | NR | SD | OS       |         |    |    |    |    | AB | DSTATE    |
| 16   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DOUMSG    |
| 17   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DOUTID    |
| 18   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DOUTP1    |
| 19   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DOUTCNT   |
| 20   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DOUTP2    |
| 21   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DSEND     |
| 22   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DRECV     |
| 23   |    |    |    |    |         |    |    |    |    |          |         |    |    |    |    |    | DEOT      |

# INP DIT (cont)

|    |   |                                          |      |                          |   |          |
|----|---|------------------------------------------|------|--------------------------|---|----------|
| 24 |   | RESERVED                                 |      | MESSAGE FROM INP TYPE    |   | DINMSG   |
| 25 |   | REQUEST IDENTIFIER (@IOQP)               |      |                          |   | DINID    |
| 26 |   | ERROR CODE                               | LS   | CSTATUS                  |   | DRSTATUS |
| 27 |   | IN COUNT                                 |      |                          |   | DINCNT   |
| 28 |   | TRANSMISSION LOG                         |      |                          |   | DXLOG    |
| 29 |   | PARAMETER                                |      |                          |   | DINPARM  |
| 30 |   | TRACE READY REQUESTS COUNT               |      |                          |   | DTRCNT   |
| 31 |   | EXTERNAL TRACE EXTRA DATA SEGMENT NUMBER |      |                          |   | DDSTN    |
| 32 |   | RESERVED                                 |      | OUT MSG TYPE AT ERROR    |   | DERROR   |
| 33 |   | REQUEST IDENTIFIER (@IOQP)               |      |                          |   |          |
| 34 |   | PARAMETER 1 (QMISC)                      |      |                          |   |          |
| 35 |   | OUT COUNT                                |      |                          |   |          |
| 36 |   | PARAMETER 2 (QPAR2)                      |      |                          |   |          |
| 37 |   | LAST CS ERROR CODE                       |      |                          |   | DCSERR   |
| 38 |   | IOQP POINTER AT TIME OF ERROR            |      |                          |   | DSAVE    |
| 39 | ! | TP!PHY DRVR VERSN #                      | !    | LOGICAL DRIVER VERSION # | ! | DVERSION |
| 40 | ! | RESERVED                                 | !    | IN MSG TYPE AT ERROR     | ! | DERRORI  |
| 41 | ! | REQUEST IDENTIFIER (@IOQP)               | !    |                          | ! |          |
| 42 | ! | ERROR CODE                               | !LS! | STATUS                   | ! |          |
| 43 | ! | IN COUNT                                 |      |                          | ! |          |
| 44 | ! | TRANSMISSION LOG                         |      |                          | ! |          |
| 45 | ! | PARAMETER                                |      |                          | ! |          |
| 46 | ! | DRIVER ERROR CODE                        |      |                          | ! | DDVRERR  |
| 47 | ! | MONITOR ERROR CODE                       |      |                          | ! | DMNTRERR |

# INP DIT (cont)

|    |   |                                            |                   |   |           |
|----|---|--------------------------------------------|-------------------|---|-----------|
| 48 | ! | HARDWARE ERROR STATUS !                    | SIO PROGRAM INDEX | ! | DSERR     |
| 49 | ! | TOOTH PICK HARDWARE ERROR STATUS           |                   | ! | DTP'ERROR |
| 50 |   | ADDITIONAL TOOTHPICK HARDWARE ERROR STATUS |                   |   |           |
| 51 | ! | DRIVER TRACE READ IOQ POINTER              |                   | ! | DTR'IOQP  |

-----

## DFLAG - Flags, IOSTATE and MAMSTATE

- ACTIVE - If set, the Driver is active servicing this device
- REQUEST - If set, service for this device was requested while the Driver was active. The Driver is run again to insure servicing of the condition which caused REQUEST to be set.
- DO'TIMING - If set, the hardware and software timers are started in the normal manner when performing an operation. If clear, no timing is done.
- SIOPREEMPT- Preemptive request queued by ATTACHIO. Not used by this Driver.
- IOPROG - If set, an I/O program is in progress. Set by STARTIO and cleared by GIP. Not used by the Driver.
- IAK - Interrupt Acknowledge If set, an interrupt has occurred or a software timeout has completed.
- SIMULATOR - If set, all I/O is to be simulated. The Driver will set flags in the DRT instead of calling STARTIO.
- MAMSTATE - Memory Manager State
- 0 - Null, no Memory Management requests or condition
  - 1 - Not used
  - 2 - Data segment associated with the first request in the Active Queue is being made present and frozen.
  - 3 - Data segment associated with the first request in the Active Queue is frozen in memory.
  - 4 - Data segment associated with the second request in the Active Queue is being made present and frozen. Implies the data segment associated with the first request is frozen.
  - 5 - Data segments associated with the first and second requests on the Active Queue are frozen in memory.
  - 6 - Not used
  - 7 - Not used

## INP DIT (cont)

-----

- IOSTATE** - Current I/O program operation being performed
- 0 - Inactive No I/O in progress
  - 1 - Idle Read The Idle Read I/O program has been started.
  - 2 - Sending message An I/O program which sends a message without data and then goes to the Idle Read section of the I/O program has been started.
  - 3 - Sending data An I/O program which sends a message and data and then goes to the Idle Read section has been started.
  - 4 - Send message and interrupt An I/O program which sends a message without data then interrupts and halts when the message is sent has been started.
  - 5 - Send data and interrupt An I/O program which sends a message with data then interrupts and halts has been started.
  - 6 - Receive data An I/O program which sends a message and receives data then interrupts and halts has been started.
  - 7 - Do not start I/O Used to hold off requesting any I/O activity during a power on reset or when an error occurs.
- DLINK** - Link word for the linked list of devices waiting to be serviced by the I/O process associated with this device
- DIOQP** - System DB relative pointer to the first element in the requests to be processed list for this device The requests are queued to this list by ATTACHIO but in processing, the are moved to other queues depending of the state of the request The Driver always attempts to keep this list empty.
- DLDEV** - Logical Device Number of this device
- DDLTP** - System DB relative pointer to the Driver Linkage Table. (DLT)
- DILTP** - System DB relative pointer to the Interrupt Linkage Table. (ILT)
- DSTATUS** - Controller hardware status Set by GIP on interrupt and the Physical Driver during certain service operations See INP ERS for description. For the Toothpick version, this word contains the software timeout flags as described for the word DTIME below.

# INP DIT (CONT)

-----

**DTRLX** - Timer request index for software timeouts as returned by the MPE procedure **TIMEREQ**

**DTIME** - Timed out flags and type 3 driver process PCB Number

**TIMED** - If set, a software timeout has completed

**READYQ** - System DB relative pointer to the IOQ for the first request in the Ready Queue. If zero, the Ready Queue is empty.

**READYQTL** - System DB relative pointer to the last IOQ in the Ready Queue. When the queue is empty, this word points to the word preceding the queue head pointer in the DIT.

**ACTIVEQ** - System DB relative pointer to the IOQ for the first request in the Active Queue. If zero, the Active Queue is empty.

**ACTIVEQTL** - System DB relative pointer to the last IOQ in the Active Queue. When the queue is empty, this word points to the word preceding then queue head pointer in the DIT.

**WAITEDQ** - System DB relative pointer to the IOQ for the first request in the Waited Queue. If zero, the Waited Queue is empty.

**WAITEDQTL** - System DB relative pointer to the last IOQ in the Waited Queue. When the queue is empty, this word points to the word preceding then queue head pointer in the DIT.

**DSTATE** - Driver state and control flags

**ERRORONLY** - If set, the Driver trace record is to be returned to the Trace Process only when an error occurs.

**WRAP** - If set, the Driver will overlay the oldest trace entry when a trace record overflow occurs. If clear, entries are lost when an overflow occurs.

**TRACEON** - If set the Driver trace facility is enabled and the Driver generates trace entries for most of its local subroutine calls.

## INP DIT (CONT)

-----

- PFSTATE** - Power failure recovery state
- 0 - No power failure recovery in progress
  - 1 - Powerfailure detected on the mainframe before INP indication. Check for completion of any pending I/O and then wait in PFSTATE 2 for INP to pfail.
  - 2 - Power failure detected on the Mainframe before INP has indicated a power failure. Wait for INP to indicate a power failure.
  - 3 - Power failure indicated by INP before being informed by the Mainframe power failure routines. Wait for the Mainframe power failed request.
  - 4 - Power failure indicated both on the Mainframe and by INP. Power failure recovery may be started.
  - 5 - Send Redo The Mainframe receive count was less than INP's send count so the dialogue must be restarted. The Driver is sending the Redo message.
  - 6 - Send Ignore The Mainframe send count was greater than INP's receive count so any part of a dialogue so far received is to be ignored and the entire dialogue will retransmitted. The Driver is sending Ignore message.
  - 7 - Recovered. The Mainframe and INP dialogue counters agree or mainframe not sending, so no recovery is necessary. The Driver is sending the recovered message informing INP to go back to its normal mode.
- UNFRZ** - If set, the source data segment is to be unfrozen when the data has been transmitted to the INP. If clear, the source data segment remains frozen until a request complete indication is returned by the INP.
- PASSREADS** - If set, then read requests are to be passed around other requests which have been impeded because no buffers are available on the INP.
- NOTRDYWAIT**- If set, then a request has been impeded because no buffers were available on the INP.
- SENDING** - If set, an I/O program which send sends a message, with or without associated data has been started but not completed.



-----

OPENSTATE - Operational state of the Driver and INP

- 0 - Not opened or closed
- 1 - In ROM The device has been opened but the RAM Operating System has not been entered
- 2 - Crashed Some catastrophic error has occurred
- 3 - In RAM. The device has been opened, down loaded and is in the RAM Operating System.

ABORT

- If set one or more requests have been aborted but the abort was not done because the aborted request was in the process of doing a Memory Management function or I/O when when request to abort was processed. The actual abort will take place when the Memory Management function completes.

The following five words hold the message block which is sent to INP when the Physical Driver is called to send a message with or without associated data. The Logical Driver sets the message contents into this area and calls the Physical Driver to send the message.

DOUMSG - Message type code for messages sent to INP

DOUTID - Request identifier associated with the message being sent.

DOUTP1 - Parameter one of the message being sent to INP

DOUTCNT - Count parameter of the message being sent to INP

DOUTP2 - Parameter two of the message being sent to INP

DSEND - Messages sent counter. This word contains the number of messages sent since the RAM Operating System was entered. It is used for power failure recovery.

DRECV - Messages received counter. This word contains the number of messages received from INP since the RAM Operating System was entered. It is used for power failure recovery.

-----

DEOT - End of dialogue flag. When a message has been sent and the EOT indicating INP has received the message is transmitted, it is received into this word. This flag is used to indicate to the Logical Driver that a transmission has been completed and that the Physical Driver should be called to check the completion status and update the IOSTATE.

The following six words are the data area into which messages from INP are received. The Physical Driver constructs I/O programs which reference this area.

DINMSG - Message type code of message from INP

DINID - Request Identifier associated with message from INP

DRSTATUS - Request Completion status

DINCNT - Number of bytes of data to be received associated with the completion of a request which results in data being sent from INP.

DXLOG - Transmission log to be returned when the request identified by DINID is completed.

DINPARM - Parameter associated with the completion of this request. This word is return in the X register by IOSTATUSX.

DTRCNT - Trace ready pending count. This word contains the number of Trace Ready messages recieved but not satisfied by Trace Read requests.

DDSTN - If not zero then internal Driver extra data segment tracing is enabled and this is the data segment number into which the trace entries are to be set.

DERROR - Driver Error block. The following sixteen words are used to store information describing the current operations being performed when a catastrophic Driver error occurred. A catastrophic error occurs on illogical Driver control data, MPE errors or when INP does not respond in an expected manner. The first five word block is used to hold the current or last message transmitted to INP when a catastrophic error condition was detected. It contains the data in the same format as message to INP block.

INP DIT (CONT)

-----

DCSERR - CS Error Code associated with a catastrophic Driver error

DSAVE - Request Identifier of the request being processed when a catastrophic Driver error was detected

DVERSION - Version numbers of the Physical and Logical Drivers

TP - If set, the Physical Driver is for the Toothpick System

PVERSION - Physical Driver version number

LVERSION - Logical Driver version number

DERROR1 - The six word block beginning here is used to hold the last message received from INP before a catastrophic Driver error was detected. It contains the data in the same format as the message from INP block.

DDRVERR - Holds the code specifying the catastrophic error detected by the Physical Driver. See ERRORS under the PHYSICAL DRIVER INTERNAL SPECIFICATIONS for the definition.

DMWTRERR - Holds the code specifying the catastrophic error detected by the Logical Driver. See ERRORS under the LOGICAL DRIVER INTERNAL SPECIFICATIONS for the definition.

DSERR - Hardware Controller status when a catastrophic Driver error was detected.

HSTATUS - Left byte of the DSTATUS word at time of error

SIOPX - SIO program area relative index to the last order executed or current order being executed at time of error.

INP DIT (CONT)

-----

DTP'ERROR - Toothpick hardware error status. To be defined.

DTR'IOQP - If not zero then an IOQP pointer to the Trace Read request which is supplying the locked and frozen buffer into which the Driver places trace entries to generate a trace record.

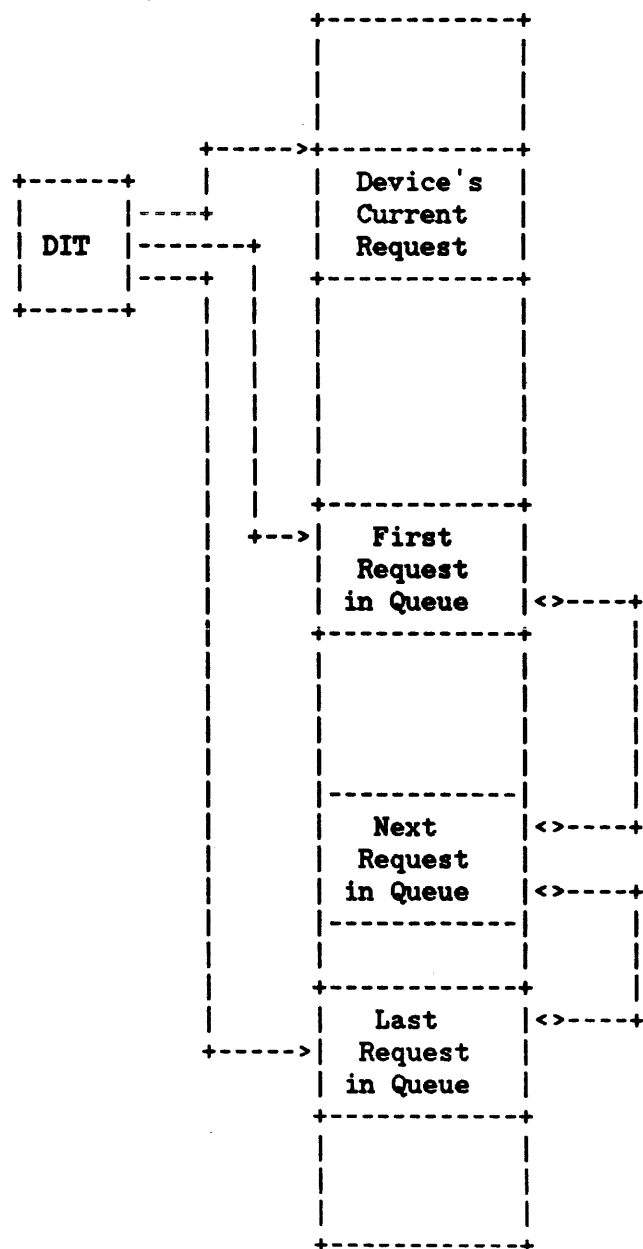
DLOGX - Driver local trace buffer index. This is the index relative to the Driver local trace buffer to place the next trace entry.

DLOGBUF - Driver local trace buffer. This buffer extends from here to the end of the DIT.

# DISC REQUEST TABLE AND DISC REQUESTS

Requests for disc transfers are effected by acquiring an entry from the Dis Request Table (DISCREQTAB), filling the proper information, and calling the DISCQMANAGER to link the request into the device's doubly linked request queue. The head and tail of a device's request queue are contained in the device's DIT.

## DISCREQTAB



# DISC REQUEST TABLE

DISCREQTAB DST ENTRY# = 56 (%70)  
DISCREQTAB PRT = %1031

## DISC REQUEST TABLE ENTRY 0 FORMAT

|              | 0                                           | 1 | 2  | 3 | 4  | 5 | 6  | 7 | 8  | 9                      | 10 | 11 | 12 | 13 | 14 | 15 |           |
|--------------|---------------------------------------------|---|----|---|----|---|----|---|----|------------------------|----|----|----|----|----|----|-----------|
| DISCREQTAB00 | --                                          |   | -- |   | -- |   | -- |   | -- |                        | -- |    | -- |    | -- |    | --        |
|              | TOTAL ENTRIES                               |   |    |   |    |   |    |   |    | PRIMARY ENTRIES        |    |    |    |    |    |    |           |
| DISCREQTAB01 | IMPEDED PROCESS PCB                         |   |    |   |    |   |    |   |    | ENTRY SIZE (%20)       |    |    |    |    |    |    |           |
| DISCREQTAB02 | TABLE INDEX OF HEAD OF AVAILABLE ENTRY LIST |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |
| DISCREQTAB03 | TABLE INDEX OF TAIL OF AVAILABLE ENTRY LIST |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |
| DISCREQTAB04 | MAX ENTRIES IN USE                          |   |    |   |    |   |    |   |    | CURRENT ENTRIES IN USE |    |    |    |    |    |    |           |
| DISCREQTAB05 | OVERFLOWS                                   |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |
| DISCREQTAB06 | TOTAL REQUESTS                              |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |
| DISCREQTAB07 |                                             |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |
| DISCREQTAB08 | SYSBASE INDEX OF HEAD OF DISABLED REQ Q     |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    | DISCQHEAD |
| DISCREQTAB09 | SYSBASE INDEX OF TAIL OF DISABLED REQ Q     |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    | DISCQTAIL |
| DISCREQTAB10 | ////////////////////////////////////        |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |
| DISCREQTAB15 | ////////////////////////////////////        |   |    |   |    |   |    |   |    |                        |    |    |    |    |    |    |           |

# DISC REQUEST ELEMENT FORMAT

|         | 0                                               | 1                         | 2 | 3 | 4 | 5 | 6 | 7 | 8         | 9 | 10 | 11 | 12     | 13 | 14 | 15 |          |
|---------|-------------------------------------------------|---------------------------|---|---|---|---|---|---|-----------|---|----|----|--------|----|----|----|----------|
| Word 00 | A                                               | M                         | D | S | I | B | C | D | M         | Q | S  | P  | C      | D  | D  | M  |          |
|         | B                                               | M                         | I | B | O | K | O | A | M         | U | I  | F  | U      | I  | I  | S  |          |
|         | O                                               | R                         | A | U | W | D | M | T | E         | E | O  | A  | R      | S  | S  | G  |          |
|         | R                                               | E                         | G | F | A |   | P | A | R         | U | F  | I  | R      | A  | A  | D  |          |
|         | T                                               | Q                         |   |   | K |   |   | F | R         | E | A  | L  | E      | B  | T  | O  |          |
|         |                                                 |                           |   |   | E |   |   |   |           |   | I  |    | Q      |    |    | N  |          |
|         |                                                 |                           |   |   |   |   |   |   |           |   | L  |    |        |    |    |    |          |
| Word 01 | REQUEST URGENCY CLASS                           |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | URGCLASS |
| Word 02 | UNIT #                                          |                           |   |   |   |   |   |   | LDEV #    |   |    |    |        |    |    |    | LDEVN    |
| Word 03 | MISCELLANEOUS                                   |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | MISC     |
| Word 04 | S                                               | DST (IF PROCESS DISC I/O) |   |   |   |   |   |   |           |   |    |    |        |    |    |    | DSTN     |
|         | BANK (IF SEGMENT TRANSFER)                      |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | S=STACK  |
| Word 05 | OFFSET INTO DATA SEG (IF PROCESS DISC I/O)      |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | ADDR     |
|         | ADDRESS IN BANK (IF SEGMENT TRANSFER)           |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    |          |
| Word 06 | FUNCTION                                        |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | FUNC     |
| Word 07 | COUNT/XLOG/CONTROL RETURNS                      |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | XFERCNT  |
| Word 08 | P1 (HODA IF SEGMENT TRANSFER                    |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | PAR1     |
| Word 09 | P2 (LODA IF SEGMENT TRANSFER                    |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | PAR2     |
| Word 10 | PCBN                                            |                           |   |   |   |   |   |   | QUALIFIER |   |    |    | STATUS |    |    |    | STAT     |
| Word 11 | SYSBASE RELATIVE INDEX OF PREV REQUEST IN QUEUE |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | PREVREQP |
| Word 12 | SYSBASE RELATIVE INDEX OF NEXT REQUEST IN QUEUE |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | NEXTREQP |
| Word 13 | SEGIDENTIFIER (IF SEG TRANSFER)                 |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | SEGIDENT |
| Word 14 | DISPLACEMENT OF READ OR WRITE FROM SEG BASE(MM) |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    | SEGDISP  |
| Word 15 | AUXREQFLAGS                                     |                           |   |   |   |   |   |   |           |   |    |    |        |    |    |    |          |

Note: Upon return to free list, word (#1) becomes index of next EE free entry.

Word 0 - QFLAG - Request dependent flags

|        |            |                                                                                                  |
|--------|------------|--------------------------------------------------------------------------------------------------|
| Bit 0  | .ABORT     | Request has been aborted externally.                                                             |
| Bit 1  | .MMREQ     | Request is for a segment transfer.                                                               |
| Bit 2  | .DIAG      | Diagnostic request (not used).                                                                   |
| Bit 3  | .SBUF      | System Buffer. Target is a system buffer whose index is relative to the start of the SBUF table. |
| Bit 4  | .IOWAKE    | Wake caller on completion of request.                                                            |
| Bit 5  | .BLOCKED   | Blocked I/O. Caller is waited in ATTACHIO until request is completed.                            |
| Bit 6  | .COMPLETED | Request has been completed and caller woken if he had specified.                                 |
| Bit 7  | .DATAFRZN  | Data segment has been made present and is frozen.                                                |
| Bit 8  | .MAMERRORD | MAM error on data segment make present.                                                          |
| Bit 9  | .PREQUEUED | Request is queued into disc's req queue                                                          |
| Bit 10 | .SFAIL     | Start SIO failure in GIP.                                                                        |
| Bit 11 | .PFail     | The I/O has been aborted because of a powerfail.                                                 |
| Bit 12 | .CURREQ    | Request is device's current request.                                                             |
| Bit 13 | .DISABLED  | Request is disabled.                                                                             |
| Bit 14 | .DISATMPT  | Attempted to disable this request.                                                               |
| Bit 15 | .MSGDONE   | A message request reply has completed.                                                           |

Word 2 - QLDEV.QLDEVN - Logical Device Number

Word 3 - QMISC - Device dependent.

Word 4

QDSTN - If SYSBUFRs is clear then this is the DST number of the target data segment. If bit 0 is set then buffer address is a DB offset value instead of segment relative offset (implemented for NOWAIT IO and NOBUFF).

Word 5

QADDR - Offset in data segment or sys buff table to target data buffer.

Word 6

QFUNC.FUNC - Function code and qualifiers as specified by driver.



Word 7

QXFERCNT-On initiation specifies the word count if positive or byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call. Certain control requests return data through this location.

Word 8

QPAR1 - Parameter one, defined by driver

Word 9

QPAR2 - Parameter two, defined by driver

QMISC - Miscellaneous request dependent storage available to driver.

Word 10

QSTAT.PCBN - PCB Number of process which made this request. Zero if not associated with any process and IOQ is to be returned by the system.

.QUALIFIER - A code which further defines or qualifies the general status. Defined by driver.

.STATUS - General Status. Indicates current and result state of the request according to the following codes.

0 - not started or awaiting completion.

1 - successful completion.

2 - end of file detected.

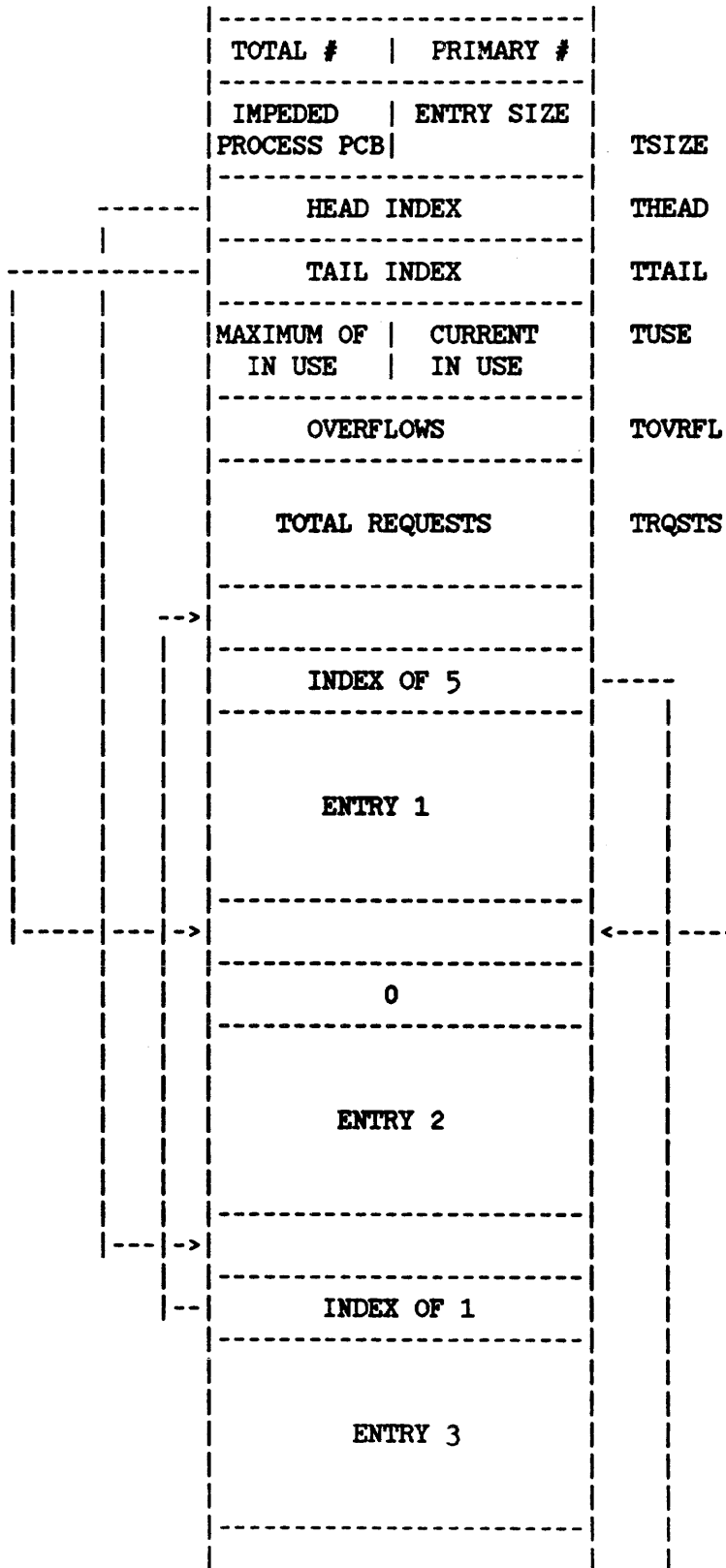
3 - unusual condition.

4 - irrecoverable error.

NOTE: See I/O System Status Returns.

# IOQ TABLE LAYOUT

DST %13



---

|                     |   |
|---------------------|---|
| Indeterminate       |   |
| ENTRY 4<br>(IN USE) |   |
|                     | ← |
| INDEX OF 2          |   |
| ENTRY 5             |   |

# I/O QUEUE ELEMENT (IOQ)

|    |                            |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    |                                                             |       |       |
|----|----------------------------|-------------------------|---|---|---|---|---|---|---|-----------|----|----|----|----|--------|----|-------------------------------------------------------------|-------|-------|
|    | 0                          | 1                       | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9         | 10 | 11 | 12 | 13 | 14     | 15 |                                                             |       |       |
|    | REQUEST DEPENDENT FLAGS    |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    |                                                             |       |       |
| 0  |                            |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QFLAG                                                       |       |       |
| 1  | IOQ POINTER                |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QLINK                                                       |       |       |
| 2  | UNIT #                     |                         |   |   |   |   |   |   |   | QLDEVN    |    |    |    |    |        |    |                                                             | QLDEV |       |
| 3  | MISCELLANEOUS              |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QMISC                                                       |       |       |
| 4  | S                          | DATA SEGMENT DST NUMBER |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QDSTN S(Word 4(0:1)<br>Stackflag If set<br>QADDR is DB rel. |       |       |
| 5  | ADDRESS                    |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QADDR                                                       |       |       |
| 6  |                            |                         |   |   |   |   |   |   |   | FUNCTION  |    |    |    |    |        |    |                                                             | QFUNC |       |
| 7  | COUNT/XLOG/CONTROL RETURNS |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QWBCT                                                       |       |       |
| 8  | P1                         |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QPAR1                                                       |       |       |
| 9  | P2                         |                         |   |   |   |   |   |   |   |           |    |    |    |    |        |    | QPAR2                                                       |       |       |
| 10 | PCBN                       |                         |   |   |   |   |   |   |   | QUALIFIER |    |    |    |    | STATUS |    |                                                             |       | QSTAT |

## QFLAG - Request dependent flags

|       |            |                                                                                                     |
|-------|------------|-----------------------------------------------------------------------------------------------------|
| Bit 0 | .ABORT     | Request has been aborted externally.                                                                |
| Bit 1 | .SPECIAL   | Special handling is to be applied to this request. For disc, indicates a memory management request. |
| Bit 2 | .DIAG      | Diagnostic request (not used).                                                                      |
| Bit 3 | .SBUF      | System Buffer. Target is a system buffer whose index is relative to the start of the SBUF table.    |
| Bit 4 | .IOWAKE    | Wake caller on completion of request.                                                               |
| Bit 5 | .BLOCKED   | Blocked I/O. Caller is waited in ATTACHIO until request is completed.                               |
| Bit 6 | .COMPLETED | Request has been completed and caller woken if he had specified.                                    |

# **I/O QUEUE ELEMENT (CONT.)**

-----

Bit 7      .DATAFRZN      Data segment has been made present and is frozen.

Bit 8      .MAMERRORD     MAM error on data segment make present.

Bit 9      .PREQ          This request has been started but was preempted by a MAM request.

Bit 10     .SFAIL         Start SIO failure in GIP.

Bit 11     .PFAIL         The I/O has been aborted because of a powerfail.

Bits12-13 .PREMPT         Preemptive type code: 1-soft, 2-hard.

Bit 15     .MSGDONE       A message request reply has completed.

QLINK - SYSDB relative pointer to next IOQ element. Points to first word of element.

QLDEV.QLDEVN - Logical Device Number

QMISC - Device dependent.

QDSTN - If SYSBUFRs is clear then this is the DST number of the target data segment.If bit 0 is set then buffer address is a DB offset value instead of segment relative offset (implemented for NOWAIT IO and NOBUFF).

QADDR - Offset in data segment or sys buff table to target data buffer.

QFUNC.FUNC - Function code and qualifiers as specified by driver.

QWBCT - On initiation specifies the word count if positive or byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call. Certain control requests return data through this location.

QPAR1 - Parameter one, defined by driver

QPAR2 - Parameter two, defined by driver

QMISC - Miscellaneous request dependent storage available to driver.

QSTAT.PCBN - PCB Number of process which made this request. Zero if not associated with any process and IOQ is to be returned by the system.

.QUALIFIER - A code which further defines or qualifies the general status. Defined by driver.

.STATUS - General Status. Indicates current and result state of the request according to the following codes.

- 0 - not started or awaiting completion.
- 1 - successful completion.
- 2 - end of file detected.
- 3 - unusual condition.
- 4 - irrecoverable error.

# I/O SYSTEM STATUS RETURNS

|                                                             | STATUS % |
|-------------------------------------------------------------|----------|
| 0 - PENDING                                                 |          |
| 1 - WAITING FOR COMPLETION                                  | 10       |
| 2 - DOING ERROR RECOVERY                                    | 20       |
| 3 - NOT READY WAIT                                          | 30       |
| 4 - NO WRITE RING WAIT                                      | 40       |
| 5 - NEW PAPER TAPE WAIT                                     | 50       |
| 1 - SUCCESSFUL                                              |          |
| 0 - NORMAL                                                  | 1        |
| 1 - READ TERMINATED WITH SPECIAL CHARACTER                  | 11       |
| 2 - TAPE RETRY FOR SUCCESS REQUIRED                         | 21       |
| 3 - LOW TAPE OR END OF TAPE AFTER WRITE                     | 31       |
| 2 - END OF FILE                                             |          |
| 1 - PHYSICAL END OF FILE                                    | 12       |
| 2 - DATA                                                    | 22       |
| 3 - END OF DATA                                             | 32       |
| 4 - HELLO                                                   | 42       |
| 5 - BYE                                                     | 52       |
| 6 - JOB                                                     | 62       |
| 7 - END OF JOB                                              | 72       |
| 3 - UNUSUAL CONDITION                                       |          |
| 1 - TERMINAL PARITY ERROR                                   | 13       |
| 2 - TERMINAL READ TIMED OUT                                 | 23       |
| 3 - I/O ABORTED EXTERNALLY                                  | 33       |
| 4 - DATA LOST                                               | 43       |
| 5 - DATA SET NOT READY OR DISCONNECT<br>OR UNIT NOT ON LINE | 53       |
| 6 - ABORTED BECAUSE OF POWER FAIL                           | 63       |
| 7 - BOT AND BSR, BSF REQUEST                                | 73       |
| 10 - TAPE RUNAWAY                                           | 103      |
| 11 - EOT AND WRITE REQUEST                                  | 113      |
| 12 - NO WRITE RING AFTER REQUEST TO OPERATOR                | 123      |
| 13 - END OF TAPE (PAPER TAPE LOW)                           | 133      |
| 14 - PLOTTER LIMIT SWITCH REACHED                           | 143      |
| 15 - ENABLE SUBSYSTEM BREAK AND NO CONTROL Y PIN            | 153      |
| 16 - READ TIME RETURNED OVERFLOW                            | 163      |
| 17 - BREAK STOPPED READ                                     | 173      |
| 20 - WRITE AND NO CARD IN WAIT STATION                      | 203      |

# I/O SYSTEM STATUS RETURNS (CONT.)

-----

## 4 - IRRECOVERABLE ERROR

|                            |     |
|----------------------------|-----|
| 0 - INVALID REQUEST        | 4   |
| 1 - TRANSMISSION           | 14  |
| 2 - I/O TIME OUT           | 24  |
| 3 - TIMING ERROR           | 34  |
| 4 - SIO FAILURE            | 44  |
| 5 - UNIT FAILURE           | 54  |
| 6 - INVALID DISC ADDRESS   | 64  |
| 7 - TAPE PARITY ERROR      | 74  |
| 11 - PAPER TAPE TAPE ERROR | 114 |
| 12 - SYSTEM ERROR          | 124 |
| 13 - INVALID SBUF INDEX    | 134 |

# TERMINAL IOQ ELEMENT

|     | 0                                | 1  | 2 | 3  | 4        | 5  | 6 | 7  | 8                    | 9  | 10 | 11 | 12             | 13 | 14 | 15 |       |  |
|-----|----------------------------------|----|---|----|----------|----|---|----|----------------------|----|----|----|----------------|----|----|----|-------|--|
|     |                                  | -- |   | -- |          | -- |   | -- |                      | -- |    | -- |                | -- |    | -- |       |  |
|     | REQUEST DEPENDENT FLAGS          |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    |       |  |
| 0   |                                  |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QFLAG |  |
| 1   | NEXT IOQP                        |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QLINK |  |
| 2   | UNIT #                           |    |   |    |          |    |   |    | LOGICAL DEVICE NUMB. |    |    |    |                |    |    |    | QLDEV |  |
|     |                                  |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    |       |  |
|     | FL                               |    |   |    | READSTOP |    |   |    |                      |    |    |    | REQUEST STATE  |    |    |    | QMISC |  |
| 4   | SF DATA SEGMENT NUMBER           |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QDSTN |  |
| 5   | TARGET ADDRESS OFFSET            |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QADDR |  |
| 6   |                                  |    |   |    |          |    |   |    | FUNCTION CODE        |    |    |    |                |    |    |    | QFUNC |  |
| 7   | COUNT/XLOG/CONTROL RETURNS       |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QWBCT |  |
| %10 | PARAMETER 1 (FUNCTION DEPENDENT) |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QPAR1 |  |
| %11 | PARAMETER 2 (FUNCTION DEPENDENT) |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    | QPAR2 |  |
| %12 | PCBN                             |    |   |    |          |    |   |    | QUALIFYING STATUS    |    |    |    | GENERAL STATUS |    |    |    | QSTAT |  |
|     |                                  |    |   |    |          |    |   |    |                      |    |    |    |                |    |    |    |       |  |

BIT0 ABORT  
 BIT1 SPECIAL  
 BIT2 DIAGNOSTIC  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 DATA FREEZE  
 BIT8 MAM ERROR  
 BIT9  
 BIT10-12 READ ERRORS  
 BIT13-15 RPLEVEL



## ----- TERMINAL IOQ FIELDS AND DEFINITIONS -----

QFLAG - Flags and request state.

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ABORT      | Abort this request and return an error indication to the caller.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| SPECIAL    | Special handling is to be applied to this request. Has no meaning for terminal requests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| DIAGNOSTIC | This is a request from a diagnostic subsystem. Not used by terminal system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SYSBUFRS   | Target is an index relative to the SBUF table of the data buffer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| IOWAKE     | Wake caller on completion of request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| BLOCKED    | Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies wake.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| COMPLETED  | Request has been completed and caller woken if requested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| DATAFRZN   | If set then the data segment has been frozen in memory. Set by MAM when a MAKEPRESENT request is successfully completed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MAMERRD    | An error has occurred in trying to make the target data segment present and freeze it in core.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| READERRORS | This field contains a code specifying the resulting status on a read termination. <ul style="list-style-type: none"><li>0 - no error</li><li>1 - read terminated on special read termination character</li><li>2 - read completed because break was enabled and detected and allowed.</li><li>3 - read data lost because of no TBUFS available, PTAPE swing buffer write not completed in time or term=11 and char following DC2 was not a CR.</li><li>4 - character lost because interrupt not service before next character was input</li><li>5 - read parity error occurred and parity checking enabled</li><li>6 - read timed out</li><li>7 - block mode read timed out</li></ul> |

## TERMINAL IOQ (CONT.)

-----

**RPLEVEL** Request preempt level. If the preempt type of the request was zero then this is the value of TMODE when the request was queued, otherwise it is the preempt type of the request.

- 0 - terminal in normal mode and non preemptive request
- 2 - normal request, terminal was in console mode when the request was queued
- 3 - soft preemptive, preempt reads with no data input
- 4 - hard preemptive, preempt all non preemptive requests

**QLINK** - SYSDB relative pointer to the next IOQ element. Points to the first word of the next element.

**QLDEV** - Logical device number.

**QLDEVN** Logical device number

**QMISC** - Request state and flags

**FLUSH (FL)** This flag is set when a control Y is detected and accepted while this request was waiting or being processed. Causes reads and writes to be successfully completed, although no I/O takes place.

**READSTOP** Stop read operation if not zero.

- 0 - null or no stop
- 1 - break has been detected and is allowed
- 2 - subsystem break has been detected and is allowed
- 3 - request has been preempted
- 4 - read operation has been timed out
- 5 - request has been aborted
- 6 - block mode read has timed out

NOTE: BIT 10 is NO STOP bit; suppresses aborts and prompts

**RSTATE** Request state. Any codes not described below are unused.

- 0 - Request not started or new.
- 1 - Request has been started. Reads or writes may be waiting for the current write to finish to be continued.
- 2 - A read operation is in progress.
- %43 - A read operation has been completed but the data has not been transferred to the callers buffer.
- %44 - A read operation has been stopped. The cause and corresponding action to be taken is identified by the STOPREAD field in QMISC.
- 5 - Read initiation conditions have been checked and the read can be started as soon as the current operation (usually a write) is completed.
- %30 - Waiting (because 270 bytes tanked or no TBUFs) to enter a CRLF because a post space write follows a previous prespace write.

# TERMINAL IOQ (CONT.)

-----

- %31 - Waiting (because 270 bytes tanked or no TBUFs) to enter prespace carriage control bytes.
- %32 - Waiting (because 270 bytes tanked or no TBUFs) to enter callers data into terminal buffers.
- %33 - Waiting (because 270 bytes tanked or no TBUFs) to enter post space carriage control bytes.
- %34 - %37 Correspond to states %30 - %33 but waiting to enter an ENQ for the 2640/44. When the ENQ has been entered into the TBUF, the state reverts to the current state -4.

STACKFLAG(SF) If the QADDR is the offset from DB to target address, otherwise QADDR is offset from DST base.

QDSTN - Contains the data segment number of the target data area.

QADDR - Offset to the target data area in the data segment or bank. For PTAPE reads, this word contains an SBUF index to the first of a pair of SBUFs used to read the data into.

QFUNC - Function code. See ATTACHIO description for details.

| FUNC | Function code field.   |                                 |
|------|------------------------|---------------------------------|
|      | 0 - read               | %17 - enable tapemode           |
|      | 1 - write              | %20 - disable timer             |
|      | 2 - file open          | %21 - enable timer              |
|      | 3 - file close         | %22 - read timer                |
|      | 4 - device close       | %23 - disable parity            |
|      | 5 - set timeout        | %24 - enable parity             |
|      | 6 - set inspeed        | %25 - logged on                 |
|      | 7 - set outspeed       | %26 - set parity                |
|      | %10 - echo on          | %27 - set terminal type         |
|      | %11 - echo off         | %30 - allocate terminal         |
|      | %12 - disable break    | %31 - clear flush and write     |
|      | %13 - enable break     | %32 - enable control X !!! echo |
|      | %14 - disable escape   | %33 - disable control X !!! ech |
|      | %15 - enable escape    | %34 - not used                  |
|      | %16 - disable tapemode | %35 - PTAPE read                |
|      |                        | %36 - set/reset break mode      |
|      |                        | %37 - set/reset console mode    |

QWBCT - Word or byte count and control returns. On initiation specifies a word count if positive or a byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call specified. Certain control requests return information through this location.

QPAR1 - Parameter one. See first page of driver listing for details.

QPAR2 - Parameter two. See first page of driver listing for details.

## TERMINAL IOQ (CONT.)

-----

**NOTE:** During PTAPE reads, QPAR1 and QPAR2 contain a double word disc base address of the virtual memory area where the spooled data is saved temporarily.

**QSTAT** - Request completion status and PCB number associated with this request.

**PCBN**        PCB number associated with request. If zero this IOQ element is returned by the system when the request is completed.

**QUALIFIER**    A code which further defines or qualifies the general status. See ATTACHIO description for details.

**STATUS**        General status. Indicates the current or resultant status of the request according to the following codes.

- 0 - not started or awaiting completion
- 1 - successfully completed
- 2 - end of file detected
- 3 - unusual condition
- 4 - irrecoverable error

# I/O QUEUE ELEMENT FOR 7976A MAG TAPE

| 0                                                                                                 | 1                                                                                                                                                                                                                    | 2                                                                                                                        | 3 | 4 | 5  | 6         | 7      | 8      | 9      | 10 | 11     | 12 | 13 | 14 | 15 | MNEMONIC |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---|---|----|-----------|--------|--------|--------|----|--------|----|----|----|----|----------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 0                                                                                                 | Request dependent flags (see below)                                                                                                                                                                                  |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QFLAG    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 1                                                                                                 | SYSDB relative pointer to next IOQ element.<br>Points to first word of element.                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QLINK    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 2                                                                                                 | Logical device number                                                                                                                                                                                                |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QLDEV    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 3                                                                                                 | R                                                                                                                                                                                                                    | B                                                                                                                        | F | G | BO | TOUT      | FSCNTR | BSCNTR | RTCNTR |    |        |    |    |    |    | QMISC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 4                                                                                                 | S                                                                                                                                                                                                                    | If QFLAG.(3:1) is clear then this is the<br>DST number of the target data segment. If<br>S is set, QADDR is DB relative. |   |   |    |           |        |        |        |    |        |    |    |    |    | QDSTN    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 5                                                                                                 | Offset in the data segment or system buffer<br>table to the target data buffer.                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QADDR    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 6                                                                                                 | Function code for<br>this request. (See<br>next section.)                                                                                                                                                            |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QFUNC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| 7                                                                                                 | On initiation, specifies the word count (>0)<br>or byte count (<0). At completion of the<br>request this location contains the actual<br>transmission count in the same units (bytes<br>or words) as in the request. |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QWBCT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| %10                                                                                               | Parameter 1. Used only for reads. Contains<br>the EOF specification in bits (13:3).                                                                                                                                  |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QPAR1    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| %11                                                                                               | Parameter 2. Used only for writes. If bit<br>(13:1) is set, writing past EOT is allowed.                                                                                                                             |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    | QPAR2    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |
| %12                                                                                               | PCBN                                                                                                                                                                                                                 |                                                                                                                          |   |   |    | QUALIFIER |        |        |        |    | STATUS |    |    |    |    | QSTAT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |   |   |    |           |        |        |        |    |        |    |    |    |    |          |

## QFLAG - Request dependent flags

|       |           |                                                                                                 |
|-------|-----------|-------------------------------------------------------------------------------------------------|
| Bit 0 | ABORT     | - Abort this request and return an error indication to the caller.                              |
| Bit 1 | SPECIAL   | - Apply special handling to this request. (Not used)                                            |
| Bit 2 | DIAG      | - This is a request from the diagnostic subsystem. (Not used)                                   |
| Bit 3 | SYSBUFF   | - Target is an index relative to the SBUF Table of the data buffer.                             |
| Bit 4 | IOWAKE    | - Wake caller on completion of request.                                                         |
| Bit 5 | BLOCKED   | - Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies IOWAKE. |
| Bit 6 | COMPLETED | - The request has been completed and the caller awakened if he had requested (with IOWAKE).     |

- Bit 7 DATAFRZN - Set by the memory management routines (MAM) when a MAKEPRESENT request is successfully completed and indicates the data segment is frozen in memory.
- Bit 8 MAMERRORD - An error has occurred while MAM was trying to make the target data segment present and freeze it in memory.
- Bit 9 PREQ - (Not used)
- Bit 10 SFAIL - Delayed failure of SIO instruction. If a call to START'HPiB resulted in the request being added to the channel queue, this bit indicates that the SIO instruction failed when the request was selected for execution.
- Bit 11 PFAIL - The request was aborted because of a system power failure.

QMISC - Driver request dependent flags and counters. Used mostly for error retries.

- RETRY - Indicates an error retry is in progress.
- BACK - Backspace record processing for an error retry is in progress.
- FORWARD - Forward space record processing for an error retry is in progress.
- GAP - Gap processing for an error retry is in progress.
- BODEOF - Backspace record due to a data EOF processing is in progress.
- TOUTCNTR - GIC timed-out counter.
- FSCNTR - Forward space record counter.
- BSCNTR - Backspace record counter.
- RTCNTR - Error retry counter.

QSTAT - PCB number and request completion status.

- PCBN - The Process Control Block (PCB) number of the process which made this request. If zero, the request is not associated with any process and the IOQ element is to be returned by the system when the request has completed.
- STATUS - General status indicating the final state of the request. The following codes are used:
  - 0 - Not started or awaiting completion.
  - 1 - Successful completion.
  - 2 - End-of-file detected.
  - 3 - Unusual, but recoverable, condition detected.
  - 4 - Irrecoverable error has occurred.
- QUALIFIER - A code which further defines or qualifies the general status. (See the section Driver Return Status Codes.)

# SERIES II/III LINE PRINTER I/O QUEUE ELEMENT (IOQ)

| 0                                                                                                 | 1                                                                                                                                                                                                                                                                                  | 2                                                                                                                        | 3 | 4 | 5 | 6 | 7 | 8                                                       | 9 | 10 | 11 | 12     | 13 | 14 | 15 | MNEMONIC |  |    |       |
|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---------------------------------------------------------|---|----|----|--------|----|----|----|----------|--|----|-------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 0                                                                                                 | Request dependent flags (see below)                                                                                                                                                                                                                                                |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QFLAG    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 1                                                                                                 | SYSDB relative pointer to next IOQ element.<br>Points to first word of element.                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QLINK    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 2                                                                                                 | Physical unit number                                                                                                                                                                                                                                                               |                                                                                                                          |   |   |   |   |   | Logical device number                                   |   |    |    |        |    |    |    | QLDEV    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 3                                                                                                 |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   | WAITFLD                                                 |   |    |    | RT     |    | MC |    | PS       |  | PP | QMISC |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 4                                                                                                 | S                                                                                                                                                                                                                                                                                  | If QFLAG.(3:1) is clear then this is the<br>DST number of the target data segment. If<br>S is set, QADDR is DB relative. |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QDSTN    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 5                                                                                                 | Offset in the data segment or system buffer<br>table to the target data buffer.                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QADDR    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 6                                                                                                 | Not used                                                                                                                                                                                                                                                                           |                                                                                                                          |   |   |   |   |   | Function code for<br>this request. See<br>next section. |   |    |    |        |    |    |    | QFUNC    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| 7                                                                                                 | On initiation, specifies the word count (>0)<br>or byte count (<0). At completion of the<br>request this location contains the actual<br>transmission count in the same units (bytes<br>or words) as in the request. The count is<br>truncated to produce a max of 256 characters. |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QWBCT    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| %10                                                                                               | Parameter 1 of QFUNC. See next section.                                                                                                                                                                                                                                            |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QPAR1    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| %11                                                                                               | Parameter 2 of QFUNC. See next section.                                                                                                                                                                                                                                            |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    | QPAR2    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |
| %12                                                                                               | PCBN                                                                                                                                                                                                                                                                               |                                                                                                                          |   |   |   |   |   | QUALIFIER                                               |   |    |    | STATUS |    |    |    | QSTAT    |  |    |       |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                                                                                    |                                                                                                                          |   |   |   |   |   |                                                         |   |    |    |        |    |    |    |          |  |    |       |

## QFLAG - Request dependent flags

|       |            |                                                                                                   |
|-------|------------|---------------------------------------------------------------------------------------------------|
| Bit 0 | .ABORT     | - Request has been aborted externally, either by the operator or a system intrinsic.              |
| Bit 1 | .SPECIAL   | - Not used.                                                                                       |
| Bit 2 | .DIAG      | - Not used.                                                                                       |
| Bit 3 | .SYSBUFERS | - Target is a system-buffer-relative index to the data buffer. *                                  |
| Bit 4 | .IOWAKE    | - Wake caller on completion of request. *                                                         |
| Bit 5 | .BLOCKED   | - Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies IOWAKE. * |
| Bit 6 | .COMPLETED | - Request has been completed, and the caller awakened if s/he had requested (with IOWAKE). *      |

- Bit 7 .DATAFRZN - If set, then the data segment has been made present and frozen in memory. Set by the memory management routines (MAM) when a MAKEPRESENT request is successfully completed. \*
- Bit 8 .MAMERRORD - An error has occurred while MAM was trying to make the target data segment present and freeze it in memory. \*
- Bit 9 .PREQ - Not used.
- Bit 10 .SFAIL - Delayed failure of SIO instruction. If a call to STARTIO resulted in the request being added to the channel queue, this bit indicates that the SIO instruction failed when the request was selected for execution.
- Bit 11 .PFAIL - The request was aborted because of a system power failure.
- Bits 12-13 .PREMPT - Not used.
- Bit 14 . - Not used.
- Bit 15 .MSGDONE - Not used.
- QMISC.WAITFLD - This field contains a code describing the current idle state of the driver. The driver orients itself at each entry, based on the state of this field.
- 0 - The current entry is the start of a new request.
  - 1 - The normal state while waiting for a completion interrupt of a print, fill or control operation.
  - 2 - An SIO channel program was in progress when an asynchronous interrupt (usually an external abort) occurred, or a 2607 printer was placed on-line after going off-line while printing. The driver enters this state and waits for three seconds for the channel program or 2607 printer to complete, so as not to pose control conflicts to the U.I. card between the driver and the program.
  - 3 - A Not Ready, Off Line or Paper Out (or Jammed) condition has been detected. The request will be continued or retried when the operator has corrected the condition and placed the printer on line.
  - 4 - A 2607 (Tally) printer has come on-line after going off-line while printing. One line of data is buffered in the printer. This state causes the driver to shift to state 2 to allow the 2607 to print and space the buffered line before sending it the next line.



- QMISC.(12:1) - RETRY (RT). Kludge to catch an LDEV configured as a 2608 when the physical device is a different subtype. Prevents Master Clear'ing and retrying a request more than once when the Power Fail/Reset device status bit is "set" by a non-2608.
- QMISC.(13:1) - MASTER' CLEAR (MC). Set when a 2608 Master Reset, required because of a printer Power Fail/Reset, is configured and executed.
- QMISC.(14:1) - PRES'PACE (PS). The current operation is a pre-space (space then print) request. This bit alerts the continuation section to fill the print buffer after spacing.
- QMISC.(15:1) - PRE'TO'POST (PP). The previous request was a prespace operation while the current operation is a postspace.
  
- QSTAT.PCBN - The Process Control Block (PCB) number of the process which made this request. If zero, the request is not associated with any process, and the IOQ element is to be returned by the system when the request has completed. \*
- QSTAT.STATUS - General status. Indicates the final state of the request. The following codes are used:
  - 0 - Not started, or awaiting completion.
  - 1 - Successful completion.
  - 2 - Not used.
  - 3 - Unusual, but recoverable, condition (such as Request Aborted Externally).
  - 4 - Irrecoverable error (such as SIO failure, memory parity error, etc.).
- QSTAT.QUALIFIER - A code which further defines or qualifies the general status.

# 2608 LINE PRINTER I/O QUEUE ELEMENT (IOQ) -- HPIB SYSTEMS

| 0                                                                                                 | 1                                                                                                                                                                                                                    | 2                                                                                                                        | 3  | 4        | 5 | 6         | 7 | 8 | 9 | 10 | 11       | 12 | 13 | 14 | 15 | MNEMONIC |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----|----------|---|-----------|---|---|---|----|----------|----|----|----|----|----------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 0                                                                                                 | Request dependent flags (see below)                                                                                                                                                                                  |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QFLAG    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 1                                                                                                 | SYSDB relative pointer to next IOQ element.<br>Points to first word of element.                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QLINK    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 2                                                                                                 | Logical device number                                                                                                                                                                                                |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QLDEV    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 3                                                                                                 | PP                                                                                                                                                                                                                   | PE                                                                                                                       | MC | TOUTCNTR |   |           |   |   |   |    | WAITCODE |    |    |    |    | QMISC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 4                                                                                                 | S                                                                                                                                                                                                                    | If QFLAG.(3:1) is clear then this is the<br>DST number of the target data segment. If<br>S is set, QADDR is DB relative. |    |          |   |           |   |   |   |    |          |    |    |    |    | QDSTN    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 5                                                                                                 | Offset in the data segment or system buffer<br>table to the target data buffer.                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QADDR    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 6                                                                                                 | Function code for<br>this request. (See<br>next section.)                                                                                                                                                            |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QFUNC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 7                                                                                                 | On initiation, specifies the word count (>0)<br>or byte count (<0). At completion of the<br>request this location contains the actual<br>transmission count in the same units (bytes<br>or words) as in the request. |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QWBCT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| %10                                                                                               | Parameter 1. Vertical Format specification.<br>(See next section for detail.)                                                                                                                                        |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QPAR1    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| %11                                                                                               | Parameter 2. Space Mode Flags. (See next<br>section for details.)                                                                                                                                                    |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QPAR2    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| %12                                                                                               | PCBN                                                                                                                                                                                                                 |                                                                                                                          |    |          |   | QUALIFIER |   |   |   |    | STATUS   |    |    |    |    | QSTAT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |

## QFLAG - Request dependent flags

- Bit 0 ABORT - Abort this request and return an error indication to the caller.
- Bit 1 SPECIAL - Apply special handling to this request. (Not used)
- Bit 2 DIAG - This is a request from the diagnostic subsystem. (Not used)
- Bit 3 SYSBUFF - Target is an index relative to the SBUF Table of the data buffer.
- Bit 4 IOWAKE - Wake caller on completion of request.
- Bit 5 BLOCKED - Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies IOWAKE.
- Bit 6 COMPLETED - The request has been completed and the caller awakened if he had requested (with IOWAKE).

- Bit 7 DATAFRZN - Set by the memory management routines (MAM) when a MAKEPRESENT request is successfully completed and indicates the data segment is frozen in memory.
- Bit 8 MAMERRORD - An error has occurred while MAM was trying to make the target data segment present and freeze it in memory.
- Bit 9 PREQ - (Not used)
- Bit 10 SFAIL - Delayed failure of SIO instruction. If a call to STARTIO resulted in the request being added to the channel queue, this bit indicates that the SIO instruction failed when the request was selected for execution.
- Bit 11 PFAIL - The request was aborted because of a system power failure.

QMISC - Driver request dependent flags and counters.

- PRE'TO'POST - Pre to post spacing change flag.
- PEJECT - Last operation was a page eject.
- MASTERCLR - Master clear done to clear powerfail bit in status.  
Master clear needs to be done from not ready conditon.
- TOUTCNTR - Channel time-out retry counter.
- WAITCODE - Indicates type of wait:
  - 0 - new request
  - 1 - completion wait
  - 2 - not ready wait

QSTAT - PCB number and request completion status.

- PCBN - The Process Control Block (PCB) number of the process which made this request. If zero, the request is not associated with any process and the IOQ element is to be returned by the system when the request has completed.
- STATUS - General status indicating the final state of the request.  
The following codes are used:
  - 0 - Not started or awaiting completion.
  - 1 - Successful completion.
  - 2 - End-of-file detected.
  - 3 - Unusual, but recoverable, condition detected.
  - 4 - Irrecoverable error has occurred.
- QUALIFIER - A code which further defines or qualifies the general status. (See the section Driver Return Status Codes.)

# 2608 Line Printer Request Codes

---

| Operation    | Function | Parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WRITE        | 1        | <p>P1 - Vertical Format Specification</p> <p>1 - use 1st data char as format spec</p> <p>%53 - "+", print and suppress spacing</p> <p>%55 - "-", print and triple space</p> <p>%60 - "0", print and double space</p> <p>%61 - "1", print and top of form</p> <p>%200-%277, print and space N-%200 lines</p> <p>%300-%377, print with channel N-%277</p> <p>All others, print and single space.</p> <p>P2 - Space Mode Flags</p> <p>(15:1) - Prespace flag</p> <p>if set, print then fill buffer</p> <p>if clear, fill buffer then print</p> <p>(14:1) - No page stepover flag</p> <p>if set, single and double space without stepover (66 lines/page)</p> <p>if clear, single and double space with stepover (60 lines/page)</p> |
| FILE OPEN    | 2        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FILE CLOSE   | 3        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| DEVICE CLOSE | 4        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| READ STATUS  | %17      | <p>Read I/O status</p> <p>Count - buffer must be at least 2 bytes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| VFC SET      | %100     | <p>Load VFC RAM</p> <p>Count - form length in words</p> <p>(0 loads RAM form internal ROM)</p> <p>P1 - 6 for 6 LPI or 8 for 8 LPI</p> <p>any other value defaults to 6 LPI</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| TAB SET      | %101     | <p>Sets logical column definition</p> <p>P1 - 0 to 15, any other value defaults to 15</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| 0                                                                                                 | 1                                                                                                                                                                                                                    | 2                                                                                                                        | 3  | 4        | 5 | 6         | 7 | 8 | 9 | 10 | 11       | 12 | 13 | 14 | 15 | MNEMONIC |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----|----------|---|-----------|---|---|---|----|----------|----|----|----|----|----------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 0                                                                                                 | Request dependent flags (see below)                                                                                                                                                                                  |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QFLAG    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 1                                                                                                 | SYSDB relative pointer to next IOQ element.<br>Points to first word of element.                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QLINK    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 2                                                                                                 | Logical device number                                                                                                                                                                                                |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QLDEV    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 3                                                                                                 | PP                                                                                                                                                                                                                   | PE                                                                                                                       | PF | TOUTCNTR |   |           |   |   |   |    | WAITCODE |    |    |    |    | QMISC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 4                                                                                                 | S                                                                                                                                                                                                                    | If QFLAG.(3:1) is clear then this is the<br>DST number of the target data segment. If<br>S is set, QADDR is DB relative. |    |          |   |           |   |   |   |    |          |    |    |    |    | QDSTN    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 5                                                                                                 | Offset in the data segment or system buffer<br>table to the target data buffer.                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QADDR    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 6                                                                                                 | Function code for<br>this request. (See<br>next section.)                                                                                                                                                            |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QFUNC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| 7                                                                                                 | On initiation, specifies the word count (>0)<br>or byte count (<0). At completion of the<br>request this location contains the actual<br>transmission count in the same units (bytes<br>or words) as in the request. |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QWBCT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| %10                                                                                               | Parameter 1. Vertical Format specification.<br>(See next section for detail.)                                                                                                                                        |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QPAR1    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| %11                                                                                               | Parameter 2. Space Mode Flags. (See next<br>section for details.)                                                                                                                                                    |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    | QPAR2    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |
| %12                                                                                               | PCBN                                                                                                                                                                                                                 |                                                                                                                          |    |          |   | QUALIFIER |   |   |   |    | STATUS   |    |    |    |    | QSTAT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |                                                                                                                          |    |          |   |           |   |   |   |    |          |    |    |    |    |          |

## QFLAG - Request dependent flags

- |       |           |                                                                                                 |
|-------|-----------|-------------------------------------------------------------------------------------------------|
| Bit 0 | ABORT     | - Abort this request and return an error indication to the caller.                              |
| Bit 1 | SPECIAL   | - Apply special handling to this request. (Not used)                                            |
| Bit 2 | DIAG      | - This is a request from the diagnostic subsystem. (Not used)                                   |
| Bit 3 | SYSBUFF   | - Target is an index relative to the SBUF Table of the data buffer.                             |
| Bit 4 | IOWAKE    | - Wake caller on completion of request.                                                         |
| Bit 5 | BLOCKED   | - Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies IOWAKE. |
| Bit 6 | COMPLETED | - The request has been completed and the caller awakened if he had requested (with IOWAKE).     |

- Bit 7 DATAFRZN - Set by the memory management routines (MAM) when a MAKEPRESENT request is successfully completed and indicates the data segment is frozen in memory.
- Bit 8 MAMERRORD - An error has occurred while MAM was trying to make the target data segment present and freeze it in memory.
- Bit 9 PREQ - (Not used)
- Bit 10 SFAIL - Delayed failure of SIO instruction. If a call to STARTIO resulted in the request being added to the channel queue, this bit indicates that the SIO instruction failed when the request was selected for execution.
- Bit 11 PFAIL - The request was aborted because of a system power failure.

QMISC - Driver request dependent flags and counters for 2631.

- PRE'TO'POST - Pre to post spacing change flag.
- PEJECT - Last operation was a page eject.
- TOUTCNTR - Channel time-out retry counter.
- POWERFAIL - Power fail flag indicates power fail occurred.
- WAITCODE - Indicates type of wait:
  - 0 - new request
  - 1 - completion wait
  - 2 - not ready wait

Format for 2619A

| 0              | 1 | 2 | 3 | 4 | 12       | 15 |
|----------------|---|---|---|---|----------|----|
| PP PE PF TO BF |   |   |   |   | WAITCODE |    |

- TOUT - Channel timed out flag
- BUF'FILL - Buffer fill operation in progress

QSTAT - PCB number and request completion status.

- PCBN - The Process Control Block (PCB) number of the process which made this request. If zero, the request is not associated with any process and the IOQ element is to be returned by the system when the request has completed.
- STATUS - General status indicating the final state of the request. The following codes are used:
  - 0 - Not started or awaiting completion.
  - 1 - Successful completion.
  - 2 - End-of-file detected.
  - 3 - Unusual, but recoverable, condition detected.
  - 4 - Irrecoverable error has occurred.
- QUALIFIER - A code which further defines or qualifies the general status. (See the section Driver Return Status Codes.)

# 2619 Line Printer Request Codes

| Operation       | Function | Parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WRITE           | 1        | <p>P1 - Vertical Format Specification</p> <p>1 - Use 1st data char as format specification.</p> <p>%53 - "+", print and suppress spacing</p> <p>%55 - "-", print and triple space</p> <p>%60 - "0", print and double space</p> <p>%61 - "1", print and top of form</p> <p>%200-%277, print and space N-%200 lines</p> <p>%300-%312, print with channel N-%277</p> <p>%320 - Fill Line Printer Buffer Only</p> <p>All others, print and single space.</p> <p>P2 - Space Mode Flags</p> <p>(15:1) - Prespace flag</p> <p>if set, print then fill buffer</p> <p>if clear, fill buffer then print</p> <p>(14:1) - No page stepover flag</p> <p>if set, single and double space without stepover (66 lines/page)</p> <p>if clear, single and double space with stepover (60 lines/page)</p> |
| FILE OPEN       | 2        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| FILE CLOSE      | 3        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| DEVICE CLOSE    | 4        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| READ STATUS     | %17      | Read I/O status<br>Count - buffer size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| *IDENTIFY       | %110     | Return ID value in Bank & Buffaddr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| *SELF TEST:     |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| INITIATE        | %111     | Subtest number to execute in Bank and Buffaddr<br>(subtest number ranges from 0 to 7)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| STATUS          | %112     | Subtest result returned in Bank & Buffaddr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| *LOOPBACK TEST: |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| WRT DATA        | %113     | Data to LP in Bank & Buffaddr [PING]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| READ DATA       | %114     | Data from LP read into Bank & Buffaddr [PONG]<br>Count - Buffer Size (256 bytes max)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

# 2631 Line Printer Request Codes - HPIB

| Operation    | Function | Parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WRITE        | 1        | <p>P1 - Vertical Format Specification</p> <p>1 - Use 1st data char as format specification.</p> <p>%53 - "+", print and suppress spacing</p> <p>%55 - "- ", print and triple space</p> <p>%60 - "0", print and double space</p> <p>%61 - "1", print and top of form</p> <p>%200-%277, print and space N-%200 lines</p> <p>%300-%307, print with channel N-%277</p> <p>%320 - Fill Line Printer Buffer Only</p> <p>All others, print and single space.</p> <p>P2 - Space Mode Flags</p> <p>(15:1) - Prespace flag</p> <p>if set, print then fill buffer</p> <p>if clear, fill buffer then print</p> <p>(14:1) - No page stepover flag</p> <p>if set, single and double space without stepover (66 lines/page)</p> <p>if clear, single and double space with stepover (60 lines/page)</p> |
| FILE OPEN    | 2        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FILE CLOSE   | 3        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| DEVICE CLOSE | 4        | Page eject if not at top of form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| READ STATUS  | %17      | <p>Read I/O status</p> <p>Count - 1 byte minimum required</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VFC SET      | %100     | <p>LOADS VFC RAM</p> <p>P1 - 1 - 1 LPI (lines per inch)</p> <p>2 - 2 LPI</p> <p>3 - 3 LPI</p> <p>4 - 4 LPI</p> <p>5 - 5 LPI</p> <p>6 - 6 LPI</p> <p>8 - 8 LPI</p> <p>12 - 12 LPI</p> <p>Any other value defaults to 6 LPI.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



# CARD READER IOQ

|     | 0                            | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8                | 9  | 10 | 11 | 12     | 13 | 14  | 15 |        |
|-----|------------------------------|----|----|----|----|----|----|----|------------------|----|----|----|--------|----|-----|----|--------|
|     | --                           | -- | -- | -- | -- | -- | -- | -- | --               | -- | -- | -- | --     | -- | --  | -- |        |
| 0   | (SEE BELOW)                  |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QFLAGS |
| 1   | IOQP POINTER TO NEXT REQUEST |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QLINK  |
| 2   | UNIT #                       |    |    |    |    |    |    |    | LOGICAL DEVICE # |    |    |    |        |    |     |    | QLDEV  |
| 3   | AUXILIARY BUFFER FLAG        |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QMISC  |
| 4   | DST NUMBER OR 0              |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QDSTN  |
| 5   | OFFSET IN DST OR BANK 0      |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QADDR  |
| 6   |                              |    |    |    |    |    |    |    | FUNCTION CODE    |    |    |    |        |    |     |    | QFUNC  |
| 7   | WORD(+) OR BYTE(-) COUNT     |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QWBCT  |
| %10 |                              |    |    |    |    |    |    |    |                  |    |    |    |        |    | EOF |    | QPAR1  |
| %11 | BINARY                       |    |    |    |    |    |    |    |                  |    |    |    |        |    |     |    | QPAR2  |
| %12 | PCB NUMBER                   |    |    |    |    |    |    |    | QUALIFIER        |    |    |    | STATUS |    |     |    | QSTAT  |

BIT0 ABORT  
 BIT1 SPECIAL  
 BIT2 DIAGNOSTIC  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 DATA FREEZE  
 BIT8 MAM ERROR  
 BIT9 0  
 BIT10 SFAIL  
 BIT11 PFAIL

CARD READER IOQ (CONT.)

-----  
QFLAG - Flags and request state.

ABORT            Abort this request and return an error indication to the caller.

SPECIAL        Special handling is to be applied to this request. Has no meaning for card reader requests.

DIAGNOSTIC    This is a request from a diagnostic subsystem. Not used by card reader driver.

SYSBUFFRS     Target is an index relative to the SBUF table of the data buffer.

IOWAKE        Wake caller on completion of request.

BLOCKED       Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies wake.

COMPLETED    Request has been completed and caller woken if requested.

DATAFRZN      If set then the data segment has been frozen in memory. Set by MAM when a MAKEPRESENT request is successfully completed.

MAMERRD       An error has occurred in trying to make the target data segment present and freeze it in core.

SFAIL         SIO program failed to start because a) device didn't respond, or b) request has queued because device was busy.

PFAIL         This request has been aborted because of a power failure.

QLINK - SYSDB relative pointer to the next IOQ element. Points to the first word of the next element.

QLDEV - Logical device number.

QLDEVN        Logical device number.

QMISC - Auxiliary buffer flag. When odd. Data is being read into an auxiliary buffer because the requested count is less than 40 words.

QDSTN - Contains the data segment number of the target data area.

QADDR - Offset to the target data area in the data segment or bank.

CARD READER IOQ (CONT.)

QFUNC - Function code. See ATTACHIO description for details.

FUNC           Function code field.

- 0 - read
- 2 - file open           (no operation)
- 3 - file close         (no operation)
- 4 - device close       (clear EOF field in LPDT)

QWBCT - Word or byte count and control returns. On initiation specifies a word count if positive or a byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call specified. Odd counts are rounded up to produce reads of an even number of bytes. All counts are truncated to produce maximum reads of 40 words for ASCII or 80 words for column binary.

QPAR1 - End of file specification. See EOFCHECK write up for details.

QPAR2 - Binary/ASCII specification.

BINARY           If 0 then ASCII code conversion; 40 words maximum read.  
                  If not 0 then column binary read; 80 words maximum read.

QSTAT - Request completion status and PCB number associated with this request.

PCBN            PCB number associated with request. If zero this IOQ element is returned by the system when the request is completed.

STATUS          General Status. See general IOQ entry for specifications.

QUALIFIER       Driver specific status. See general IOQ entry.

# I/O QUEUE ELEMENT FOR HPIB CARD READER

| 0                                                                                                 | 1                                                                                                                                                                                                                    | 2 | 3 | 4 | 5         | 6 | 7 | 8 | 9      | 10 | 11 | 12 | 13    | 14 | 15 | MNEMONIC |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-----------|---|---|---|--------|----|----|----|-------|----|----|----------|
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 0                                                                                                 | Request dependent flags (see below)                                                                                                                                                                                  |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QFLAG    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 1                                                                                                 | SYSDB relative pointer to next IOQ element.<br>Points to first word of element.                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QLINK    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 2                                                                                                 | Logical device number                                                                                                                                                                                                |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QLDEV    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 3                                                                                                 | Auxillary buffer flag.                                                                                                                                                                                               |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QMISC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 4                                                                                                 | S If QFLAG.(3:1) is clear then this is the<br>DST number of the target data segment. If<br>S is set, QADDR is DB relative.                                                                                           |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QDSTN    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 5                                                                                                 | Offset in the data segment or system buffer<br>table to the target data buffer.                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QADDR    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 6                                                                                                 | Function code for<br>this request. (See<br>next section.)                                                                                                                                                            |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QFUNC    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| 7                                                                                                 | On initiation, specifies the word count (>0)<br>or byte count (<0). At completion of the<br>request this location contains the actual<br>transmission count in the same units (bytes<br>or words) as in the request. |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QWBCT    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| %10                                                                                               | Parameter 1. Contains the EOF specification                                                                                                                                                                          |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QPAR1    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| %11                                                                                               | Parameter 2. Contains the data mode<br>specification in bits (11:2). (See below card<br>reader request codes for detail information)                                                                                 |   |   |   |           |   |   |   |        |    |    |    |       |    |    | QPAR2    |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |
| %12                                                                                               | PCBN                                                                                                                                                                                                                 |   |   |   | QUALIFIER |   |   |   | STATUS |    |    |    | QSTAT |    |    |          |
| +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+ |                                                                                                                                                                                                                      |   |   |   |           |   |   |   |        |    |    |    |       |    |    |          |

## QFLAG - Request dependent flags

- Bit 0 ABORT - Abort this request and return an error indication to the caller.
- Bit 1 SPECIAL - Apply special handling to this request. (Not used)
- Bit 2 DIAG - This is a request from the diagnostic subsystem.
- Bit 3 SYSBUFF - Target is an index relative to the SBUF Table of the data buffer.
- Bit 4 IOWAKE - Wake caller on completion of request.
- Bit 5 BLOCKED - Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies IOWAKE.
- Bit 6 COMPLETED - The request has been completed and the caller awakened if he had requested (with IOWAKE).
- Bit 7 DATAFRZN - Set by the memory management routines (MAM) when a MAKEPRESENT request is successfully completed and indicates the data segment is frozen in memory.

- Bit 8 MAMERRORD - An error has occurred while MAM was trying to make the target data segment present and freeze it in memory.
- Bit 9 PREQ - (Not used)
- Bit 10 SFAIL - Delayed failure of SIO instruction. If a call to STARTIO resulted in the request being added to the channel queue, this bit indicates that the SIO instruction failed when the request was selected for execution.
- Bit 11 PFAIL - The request was aborted because of a system power failure.

QMISC - Auxillary buffer flag used to indicated a read into the driver's buffer and not the user's buffer.

QSTAT - PCB number and request completion status.

- PCBN - The Process Control Block (PCB) number of the process which made this request. If zero, the request is not associated with any process and the IOQ element is to be returned by the system when the request has completed.
- STATUS - General status indicating the final state of the request.  
The following codes are used:
  - 0 - Not started or awaiting completion.
  - 1 - Successful completion.
  - 2 - End-of-file detected.
  - 3 - Unusual, but recoverable, condition detected.
  - 4 - Irrecoverable error has occurred.
- QUALIFIER - A code which further defines or qualifies the general status. (See the section Driver Return Status Codes.)

# DATA COMMUNICATIONS IOQ ENTRY

|    | 0                         | 1  | 2          | 3  | 4  | 5  | 6  | 7  | 8        | 9  | 10 | 11 | 12     | 13 | 14 | 15 |                                          |
|----|---------------------------|----|------------|----|----|----|----|----|----------|----|----|----|--------|----|----|----|------------------------------------------|
| 0  | --                        | -- | --         | -- | -- | -- | -- | -- | --       | -- | -- | -- | --     | -- | -- | -- | (SEE BELOW)                              |
| 1  | NEXT IOQP                 |    |            |    |    |    |    |    |          |    |    |    |        |    |    |    |                                          |
| 2  | UNIT #                    |    |            |    |    |    |    |    | QLDEVN   |    |    |    |        |    |    |    |                                          |
| 3  | IOQ STATN/LAST STATN REF  |    |            |    |    |    |    |    |          |    |    |    |        |    |    |    |                                          |
| 4  | S                         |    | BUFFER DST |    |    |    |    |    |          |    |    |    |        |    |    |    | S=STACKFLAG                              |
| 5  | BUFFER1 ADDR              |    |            |    |    |    |    |    |          |    |    |    |        |    |    |    |                                          |
| 6  |                           |    |            |    |    |    |    |    | FUNCTION |    |    |    |        |    |    |    |                                          |
| 7  | COUNT/TLOG                |    |            |    |    |    |    |    |          |    |    |    |        |    |    |    |                                          |
| 8  | BUFFER2 ADDR/CONTROL CODE |    |            |    |    |    |    |    |          |    |    |    |        |    |    |    |                                          |
| 9  | TCOUNT2/PARAMETER         |    |            |    |    |    |    |    |          |    |    |    |        |    |    |    |                                          |
| 10 | USER PCBN                 |    |            |    |    |    |    |    | I/O QS   |    |    |    | I/O GS |    |    |    | QS=QUALIFIED STATUS<br>GS=GENERAL STATUS |

BIT0 ABORT  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 DATA FROZEN  
 BIT8 MAM ERROR  
 BIT 10 SFAIL  
 BIT11 PFAIL  
 BIT14 TIMER  
 BIT15 MSG ERROR

GS 0=PENDING  
 GS 1=SUCCESSFUL  
 GS 2=END OF TRANSMISSION  
 RECEIVED  
 GS 3=UNUSUAL CONDITION

Word 0    .ABORT        - Abort this I/O request  
           .SYSBUF     - Data is in system buffers  
           .IOWAKE     - Wake caller upon completion  
           .BLOCKED    - Blocked I/O, do blocked AWAKE  
                       when I/O is complete  
           .COMPLETE   - Request has been completed  
           .DATAFRZN   - The DST has been frozen  
           .MAMERRORD   - MAM failed to freeze the DST  
           .SFAIL      - The I/O program failed to start  
                       due to no SIO OK  
           .PFAIL      - The Abort bit was set because  
                       of a power failure  
           .TIMED      - An I/O timeout request has completed  
           .MSGDONE     - A message reply has been completed

# SBUF AND TBUF TABLE LAYOUT

|    |                      |                |        |
|----|----------------------|----------------|--------|
|    | SECONDARY #          | PRIMARY #      |        |
|    | IMPEDED PROCESS PCB  | ENTRY SIZE     | TSIZE  |
|    | HEAD INDEX           |                | THEAD  |
|    | TAIL INDEX           |                | TTAIL  |
|    | MAXIMUM OF IN USE    | CURRENT IN USE | TUSE   |
|    | OVERFLOWS            |                | TOVRFL |
|    | TOTAL REQUESTS       |                | TRQSTS |
|    | INDEX OF 5           |                |        |
| -> | ENTRY 1              |                |        |
|    | 0                    |                |        |
| -> | ENTRY 2              |                |        |
| -  | INDEX OF 1           |                |        |
| -> | ENTRY 3              |                |        |
|    | INDEX OF 2           |                |        |
|    | ENTRY 4<br>(IN USE ) |                |        |
|    | INDEX OF 4           |                |        |
|    | ENTRY 5              |                |        |

3 - 1 - 5 - 4 - 2

## TABLE ELEMENT ALLOCATION (TBUF AND SBUF)

-----

The allocation of the elements in the IOQ terminal buffer (TBUF) and system buffer (SBUF) tables is of concern to the I/O system.

### FREE LIST OF TABLE ELEMENTS

These tables are in the form of a free-linked list of the free elements. For the SBUF's the -1 word of entry is the link to the next element. For the TBUF's, word zero is the link and word 1 is the link for the IOQ elements.

Each word has an 8-word header beginning at the base of the table. The first four words of the header are for managing the table and the second four are for monitoring table activity.

The entries follow the header at word eight.

### ELEMENT ALLOCATION

Elements are obtained from the beginning of the free list, pointed to by the head and returned to the end of the free list pointed by the tail.

When the free list is empty, the head index is zero and the tail index is set to point at the head index.

The tables are divided into two areas: a primary and a secondary area. Most requests are obtained from the primary area. The secondary area is used only for critical requirements when the primary area is exhausted. These areas are logical areas determined by parameters in the header.

The utility of the core resident tables is seriously reduced if their use is not restricted to dynamic situations.

One of three responses must be specified to the routines which allocate elements from the I/O system tables.

1. Impede caller if primary is empty.
2. Get from primary area only.
3. Get from secondary area if primary area is empty.



# TABLE ELEMENT ALLOCATION (CONT.)

Request types 2 and 3 return an indication to the caller if the request could not be satisfied. The following table specifies the types of calls for element allocation and the action if an element is not activated.

| BUFFER USER                    | CALL TYPE | FINAL ACTION   |
|--------------------------------|-----------|----------------|
| SBUF's                         |           |                |
| File system                    | Impede    | ---            |
| Ptape                          | Impede    | ---            |
| Bad track                      | Primary   | Forget request |
| TBUF's                         |           |                |
| Terminal write (impedable)     | Impede    | ---            |
| Terminal write (not impedable) | Primary   | I/O error      |
| Terminal read on ICS           | Secondary | I/O error      |
| Log error                      | Primary   | Forget request |
| IOQ's                          |           |                |
| ATTACHIO (not impedable)       | Primary   | Return IOQX-0  |
| ATTACHIO (impedable)           | Impede    | ---            |
| SIODM (memory management)      | Secondary | Sudden death   |
| IOMESSAGE                      | Secondary | I/O error      |

## HEADER DEFINITION

|                |                                                                                                       |
|----------------|-------------------------------------------------------------------------------------------------------|
| Primary #      | - Number of elements in the primary area.                                                             |
| Total #        | - Total number of elements in the table.                                                              |
| Size           | - Size in words of each element.                                                                      |
| Impeded PCB    | - If not zero then contains the PCB number of the first process waiting for an element in this table. |
| Head index     | - Index of first free element.                                                                        |
| Tail index     | - Index of last free element.                                                                         |
| In use         | - Current number not in free list.                                                                    |
| Overflows      | - Number of requests made for an element.                                                             |
| Total requests | - Total number of elements requested.                                                                 |

QI -

|     |                    |
|-----|--------------------|
| 63. | RESERVED           |
| 50. |                    |
| 49  | CANDPIN            |
| 48  | LAST WEIGHT        |
| 47  | PAUSETIME          |
| 46  |                    |
| 45  | LISTSTATE          |
| 44  | CUREFILTER         |
| 43  | CURDFILTER         |
| 42  | CWNUM              |
| 41  | CWIDENOM           |
| 40  | CURCFILTER         |
| 39  | MAXCFILTER         |
| 38  | MINCFILTER         |
| 37  | ESCHEDBASE         |
| 36  | DSCHEDBASE         |
| 35  | CSCHEDBASE         |
| 34  | WORSTEPRI          |
| 33  | WORSTDPRI          |
| 32  | WORSTCPRI          |
| 31  | MISC. BOUNDS FLAGS |
| 30  | SYSTEM MEM BOUND   |
| 29  | XDS UPPER BOUND    |
| 28  | DL INITIAL         |

|    |                |                                          |
|----|----------------|------------------------------------------|
| 27 |                |                                          |
|    | RESERVED       |                                          |
| 22 |                |                                          |
| 21 | PAUSETIME      | MPE III ONLY!                            |
| 20 |                | MPE III ONLY!                            |
| 19 | PAUSECODE      | MPE III ONLY!                            |
| 18 | DISAP          | PSEN, PSDB counter                       |
| 17 | Reserved       |                                          |
| 16 | SDST           | process' stack DST#                      |
| 15 | PSTA           | pseudo-interrupt status                  |
| 14 | PADDR          | pseudo-interrupt address                 |
| 13 | TRACE FLAG     | flag set non-zero on IEXIT away from ICS |
| 12 | PFAIL          | PTR to powerfail PCB                     |
| 11 | JCUT           | absolute JCUT address                    |
| 10 | XP             | pointer to executing process PCB         |
| 9  | PCBX           | absolute stack address                   |
| 8  | Z              | stack DB relative Z                      |
| 7  | DL             | stack DB relative DL                     |
| 6  | S              | stack DB relative S                      |
| 5  | SBANK          | stack bank                               |
| 4  | STDB           | absolute stack DB                        |
| 3  | 0              |                                          |
| 2  | P              |                                          |
| 1  | STATUS         | > DISPATCH stack marker                  |
| 0  | P   0          |                                          |
| +1 | DB BANK RETURN |                                          |
|    | DB RETURN      | > FOR DISPATCH                           |
|    | D   PARM       |                                          |

P=PSEUDO-DISABLED AND DISP INSTRUCTION EXECUTED.  
D=DISPATCHER INTERRUPTED.

-19 PAUSECODE(MPE III ONLY): 0 = system not paused    1 = paused for disc  
                                  2 = paused for swap     3 = system idle

ICS GLOBAL CELLS, with initial values

-----

STDB - absolute address of the currently running process's stack.  
SBANK - bank address for process' stack.  
S - stack DB relative S  
DL - stack DB relative DL  
Z - stack DB relative Z  
PCBX - absolute stack address  
XP - PCB table relative pointer to word 0 of the running process' PCB.

The above cells are to be initialized for the PROGENITOR.

CPCB - absolute 4, is an absolute version of XP. If CPCB is zero, then the above cells are invalid. This will never be the case in a process. CPCB should also be set by INITIAL.  
SDST - DST# for running process' stack.  
JCUT - the bank zero absolute address of the JCUT table.  
PADDR - PB relative address for the procedure PSEUDOINT.  
PSTA - status value for PSEUDOINT, %140000+CST#.  
DISAP - PSDB counter, initially 0.

INITIAL sets the above as described.

INPUT DEVICE DIRECTORY/OUTPUT DEVICE DIRECTORY

IDD/ODD

| 0  | 7 8                   | 15                  |    |
|----|-----------------------|---------------------|----|
| 0  | MAXSIZE               | CURSIZE             | 0  |
| 1  | HEADSIZE              | ENTRYSIZE           | 1  |
| 2  | SUBENTRY AREA POINTER |                     | 2  |
| 3  | DD                    | NEXT DEVICE FILE ID | 3  |
| 4  | FENCE                 |                     | 4  |
| 5  |                       |                     | 5  |
| 6  |                       |                     | 6  |
| 7  |                       |                     | 7  |
| 10 | DEVICE OUTFENCE       | LDEV#               | 8  |
| 11 | HEADP                 |                     | 9  |
| 12 | TAILP                 |                     | 10 |
| 13 |                       |                     | 11 |
|    | HEAD ENTRY            |                     |    |
|    | HEAD ENTRY            |                     |    |
|    | ETC                   |                     |    |
|    | 1st SUBENTRY AREA     |                     |    |
|    | SUBENTRY AREA         |                     |    |
|    | ETC                   |                     |    |

MAXSIZE-SIZE (WORDS/128)

CURSIZE-SIZE (WORDS/128)

HEADSIZE-SIZE m(4)

ENTRYSIZE-SIZE (36(8)=30(10))

DD-0=INPUT DEVICE DIRECTORY

1=OUTPUT DEVICE DIRECTORY

FENCE-SEE JMAT DEFINITION

DEVICE OUTFENCE IS

---> ZERO IF FENCE (WD 4)

IS TO BE USED

>1st HEAD ENTRY

HEADP/TAILP-HEAD POINTER

IMMEDIATELY FOLLOWED BY

TAILPOINTER. EACH POINTS TO

WORD 0 OF SUBENTRY. NULL CHAIN:

HEAD=0 TAIL=ADDRESS OF HEAD.

CHAIN TERMINATED BY A 0 LINK

# XDD (IDD/ODD) SUBENTRY FORMAT

---->BIT RESERVED FOR TAPE LABELS

|    | 0                | 1 | 2       | 3 | 4 | 5 | 6 | 7      | 8     | 9 | 10 | 11 | 12 | 13 | 14 | 15 |    |
|----|------------------|---|---------|---|---|---|---|--------|-------|---|----|----|----|----|----|----|----|
| 0  | ST               |   | OUTPRI  |   |   |   | C | DEVICE |       |   |    |    |    |    |    |    |    |
| 1  | TY               |   | JNUMBER |   |   |   |   |        |       |   |    |    |    |    |    |    |    |
| 2  | USER NAME        |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 2  |
| 3  |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 3  |
| 4  |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 4  |
| 5  |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 5  |
| 6  | ACCOUNT NAME     |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 6  |
| 7  |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 7  |
| 10 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 8  |
| 11 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 9  |
| 12 | JOB NAME         |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 10 |
| 13 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 11 |
| 14 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 12 |
| 15 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 13 |
| 16 | FILE NAME        |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 14 |
| 17 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 15 |
| 20 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 16 |
| 21 |                  |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 17 |
| 22 | DEVICE FILE ID   |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 18 |
| 23 | TF DA ////////// |   |         |   |   |   |   |        | HEADX |   |    |    |    |    |    |    | 19 |
| 24 | LOGICAL DEVICE   |   |         |   |   |   |   |        | LABEL |   |    |    |    |    |    |    | 20 |
| 25 | SECTOR ADDRESS   |   |         |   |   |   |   |        |       |   |    |    |    |    |    |    | 21 |

NOTE 1

# XDD SUBENTRY FORMAT (CONT.)

|    |                     |           |    |
|----|---------------------|-----------|----|
| 26 | NUMBER OF EXTENTS   | LDEV      | 22 |
| 27 | LAST EXTENT SIZE    |           | 23 |
| 30 | SQZ / RS  F  S AB / | NUMCOPIES | 24 |
| 31 | LINK POINTER        |           | 25 |
| 32 | NUMBER OF IMAGES    |           | 26 |
| 33 |                     |           | 27 |
| 34 | TIME MADE READY     |           | 28 |
| 35 |                     |           | 29 |

SQZ- EXTENT PURGING AFTER EXTENT PRINTED

ST-STATE OF ENTRY

0=ACTIVE

1=READY

2=OPENED

3=IGNORE (LOCKED)

C-DEVICE IS A CLASS INDEX TO DEVICE

CLASS TABLE

TY-JOB TYPE

0=SESSION' (SPOOK)

1=SESSION

2=JOB

3=JOB' (SPOOK)

TF-1=THERE EXISTS FORMS

DA-1=:DATA CREATED INPUT FILE

HEADX-INDEX OF HEAD ENTRY FOR

THIS CHAIN OF SUBENTRIES

RS-1=RESTART IS REQUESTED IF WARM-

START WAS NECESSARY

F - 1=NON-STANDARD FORM CONTROL

ON DEVICE

S - 1=FAILURE DURING ALLOCATION OF

NEW EXTENT

AB - ABORTED JOB \$STDLIST ENTRY

NOTE 1 - SPOOLFILE EXTENSION

OR LABEL EXTENSION



## SPOOK Tape Format

The overall format of output tapes produced by the SPOOK "OUTPUT" command is shown below. The various components of the tape are then described in detail. The format described here is subject to change as MPE evolves. Also, there may be errors in SPOOK which would cause the actual tape format to differ from the one described here in some cases. All numeric information is in integer format unless otherwise specified.

EOF

EOF

Label Record

EOF

File Directory Records

Device and Class Directory Record

EOF

Spoolfile

EOF

Spoolfile

EOF

.....

Mechanisms for End-of-tape and tape switching are the same as for STORE/RESTORE tapes.

### Label Record

Words 0-13: SPOOLFILETAPE LABEL-HP3000.

Word 23: reel number (first reel is number 1)

Word 24: date (from CALENDAR intrinsic)

Words 25&26: time (from CLOCK intrinsic)

All other words are zero.

### File Directory

The File Directory has one entry for each spoolfile on the tape. Each entry is 12 words, and entries are packed into as many 1020-word records as needed. The last record will be padded with zeros if necessary. The entry format is:

Word 0: Device file id number (bit 0 is on to indicate that the file is an output spoolfile)

Words 1-3: zero

Words 4-7: User name

Words 8-11: Account Name

### Device and Class Directory

The Device and Class Directory is contained in one 1024-word record. There is no EOF separating this record from the File Directory. This directory contains one entry for each logical device or device class linked to the spoolfiles on the tape. Also, there is an entry for each logical device in each class in the directory, whether or not that logical device was directly referenced by a spoolfile. The entries are packed into the tape record one after another in no particular order. The entry formats are shown below.

#### Logical Device Entry

Word 0: logical device number

Word 1: Bits 0:8 : device subtype  
Bits 8:8 : 3 (=length of this entry in words)

Word 2: device type

!

### Device Class Entry

Word 0: Device class number (negated). This is the number of the entry of this device class in the system's Device Class Table.

Word 1: Total number of words in this entry.

Words 2 on: The entire contents of the Device Class Table entry for this device class.

There is one known bug in the Device and Class Directory. The last logical device in each class will be skipped when generating device entries for the members of the class. Unless that logical device is entered into the directory for some other reason, it will not be present.

### Spoolfile Format

ODD entry (30-word tape record)

Spoolfile block ---> Two spoolfile blocks packed into one  
Spoolfile block 1024-word tape record.

Two spoolfile blocks

Two spoolfile blocks

.....

The first few spoolfile blocks have been modified to contain user label information from the spoolfile. This is explained later.

### Spoolfile Block Format

A spoolfile block is a 512-word block that contains variable length records in spooler format. The 2680 is intimately familiar with this structure. Any effort to change this format should be cleared with the 2680 project in Boise first! Spoolfile records start at the first word of the block. The last record is followed by a -1 to indicate that no more records follow. The

last two words of the block contain a doubleword which is the record number of the first record in the block.

### Spoolfile Record Format

Word 0: Byte count of record - 2

Word 1: Byte count of data portion of record. Note that this count includes trailing blanks. However, trailing blanks are truncated in the actual record, so this count may be more than the number of bytes actually present in the data portion.

Word 2: Function Code: 1=Fwrite  
2=Fcontrol  
3=Fopen  
4=Fclose  
%200 and beyond=Fdevicecontrol

Word 3: P1 -- ATTACHIO parameter

Word 4: P2 -- ATTACHIO parameter

Words 5 on: Data Portion of Record

### User Labels Information

In the C-Mit and newer MPE versions, spoolfiles have a number of user labels with several kinds of information. These are:

1. Master: user label 0.
2. FOPEN entry catalog: user labels 1-10.
3. Circular queue for restart checkpointing: user labels 11-27.

Since older versions of MPE did not use user labels, a way was needed to incorporate them into the SPOOK tape format without losing forward and backward compatibility. The method used is to add several special spoolfile blocks to the beginning of the spoolfile on tape. Each of these blocks has exactly one FOPEN record at its beginning. This record is followed by a -1. Thus old versions of MPE will assume that the rest of the block is

garbage. However, the rest of the block is actually used to contain user label information. The first two spoolfile blocks (i.e. the first tape record of the spoolfile proper) contain only the FOPEN records. The next 5 tape records actually contain user labels in addition to the FOPEN records. The user labels are packed 3 to a spoolfile block, 6 to a tape record. Each spoolfile block of 512 words has the following format:

|       |            |                               |
|-------|------------|-------------------------------|
| Words | 0-4:       | FOPEN record                  |
| Word  | 5:         | -1 (to "terminate" the block) |
| Words | %200-%377: | user label                    |
| Words | %400-%577: | user label                    |
| Words | %600-%777: | user label                    |

Following this special group of blocks, the spoolfile resumes a normal format. The special FOPEN records all have the number of user labels in P2.

It is often the case that some of the 27 user labels have not been initialized before the tape is written. In that case, their places will be filled with garbage. There is no easy way of detecting this except by careful inspection.

# CHAPTER 15 UNIFIED COMMAND LANGUAGE (UNCL)

## REPLY INFORMATION TABLE (RIT)

DST %34; SIR %25

|   |                                            |   |
|---|--------------------------------------------|---|
| % | -----                                      |   |
| 0 | NUMBER OF ENTRIES                          | \ |
| 1 | MAX NUMBER OF ENTRIES                      |   |
|   | =====                                      | / |
| 0 | PROCESS NUMBER (PIN)                       | \ |
| 1 | DST# (FOR REPLY)                           |   |
| 2 | BUFFER ADDRESS (DST RELATIVE)              |   |
| 3 | MAX LENGTH OF STRING   REPLY TYPE EXPECTED |   |
| 4 |                                            |   |
| 5 |                                            |   |
| 6 |                                            |   |
| 7 | # BYTES IN MESSAGE                         |   |
|   | MESSAGE IN ASCII                           |   |
|   | (UP TO 74 CHARS.)                          |   |
|   | -----                                      | / |

TABLE  
HEADER (2 WDS.)

ENTRY  
(45 WDS.)

NOTE: Process Number = 0 means entry is empty

Reply Type = 0 for number (num)  
 = 1 for yes or no (y/n)  
 = 2 for string (sxx)  
 = 3 for yes, no, or STRING

TABLE SIZE = 1024 words

MAX # OF ENTRIES = 22  
 = 4 for string

-----

The message system consists of the following parts:

- Callable intrinsic GENMESSAGE.
- Uncallable procedure GENMSG which is used by MPE.
- System message catalog (CATALOG.PUB.SYS) and any number of user catalogs.
- Program MAKECAT which builds message catalogs.
- MESSAGE SIR %24
- MESSAGE SYSGLOB CELLS %371-373
- MESSAGE DATA SEGMENT

The message system is used by calling GENMESSAGE (or GENMSG) with a message number. The message system fetches the message from a message catalog, inserts parameters, then routes the message to a file or returns the message in a buffer to the caller.

A message catalog is a numbered editor-type file containing sets of messages. The sets serve to break a catalog into manageable portions. A message system user may call GENMESSAGE using either his own message catalog or using MPE's catalog (CATALOG.PUB.SYS).

After creating a message file, run the program MAKECAT in order to build a catalog that is readable by the message system. This file is still readable by the editor (it can be "texted") but it contains a directory (written as a userlabel).

In order to use the message catalog, the program must first open the message catalog, then call GENMESSAGE with the file number, set number and message number. (MPE users don't need to open the catalog, GENMSG automatically uses CATALOG.PUB.SYS.) The file must be opened with the aoptions "NOBUF" and "MULTI" -record access.

#### MESSAGE CATALOG

-----

Messages in the catalog can be of any length and can contain up to five parameters. Continuation of a message is indicated by "%" or "&" at the end of a line. The "%" symbol indicates that the message is continued and that a carriage return, line feed be issued the terminal. The "&" symbol indicates that the message is continued on the same line with no carriage return, line feed.

Parameters may be inserted into the message fetched from the catalog. The parameters are passed in the GENMESSAGE (or GENMSG) call and inserted wherever a "!" is found. Message sets are indicated by "\$SET n" starting in column 1 (the rest of the line is treated as a comment). Maximum value for n is 63. Comments can be inserted in the catalog by placing "\$" in column 1. Message numbers are positive integers, need not be contiguous, but must be in ascending order. After processing by the program MAKECAT, the catalog file contains records of 80 bytes, blocked 16, in 32 extents. (The system message catalog is only one extent, however). The format of the message catalog is as follows:



## MESSAGE SYSTEM (CONT.)

-----  
\$SET 1     SYSTEM MESSAGES  
1 LDEV #! IN USE BY FILE SYSTEM  
2 LDEV #! IN USE BY DIAGNOSTICS  
3 LDEV IN USE, DOWN PENDING  
5 IS "!" ON LDEV#! (Y/N)?  
.  
.  
.  
\$ MESSAGE 35 IS TWO LINES LONG, A PARAMETER STARTS THE  
\$ FIRST LINE AND THE SECOND LINE IS "HP32002"  
35 !%  
HP32002B.00.!  
.  
.  
.  
276 LDEV # FOR "!" ON ! (NUM)!  
\$  
\$SET 2 CIERROR MESSAGES  
82 STREAM FACILITY NOT ENABLED:   SEE OPERATOR.   (CIERR 82)  
200 MORE THAN 30 PARAMETERS TO BUILD COMMAND.   (CIERR 200)  
.  
.  
.  
204 FILE COMMAND REQUIRES AT LEAST TWO PARAMETERS, INCLUDING THE  
FORMAL NAME OF THE FILE   (CIERR 204)  
.  
.

## MAKECAT PROGRAM

-----  
The program MAKECAT.PUB.SYS is used to build message catalogs (and also HELP catalogs). The program's input file has the formaldesignator INPUT, which must be used for all entry points. The program has the following entry points:

- (no entry point) - Reads from input file and builds a temporary file (formaldesignator CATALOG). Also renames any old temporary CATALOG, CATnn, using an archival numbering scheme (i.e., CAT1, CAT2, etc.).
- BUILD - (Must log on under MANAGER.SYS.) Reads from input file, build the system message catalog (formaldesignator CATALOG), and installs the message system. Existing catalog is renamed CATnnnn according to the same scheme as for no entry point (above). Installation of the message system means moving the directory contained in the userlabel of the catalog into a data segment. The DST number and the disc address of CATALOG are placed in system global area. The message system may be installed while the system is running.

## MESSAGE SYSTEM (CONT.)

-----

- DIR           - (Must have PM or OP capability.) Installs the system message catalog (does not build a new one). Opens input file, moves the directory in the CATALOG into a data segment, and places the DST number and disc address of CATALOG in system global area. This may be done when the message system seems to be "broken", but the catalog is intact. (MPE is issuing "MISSING MSG. SET=mm. MSG=nn" at terminals and at the console.) This may be done while the system is running.
- HELP          - Used to build the HELP catalog. Reads input file and builds a HELP catalog (formal designator HELPCAT).

MESSAGE SYSTEM

CATALOG.PUB.SYS

- \$SET 1 - SYSTEM MESSAGES (FORMER MESSAGE CATALOG)
- \$SET 2 - CIERROR MESSAGES
- \$SET 3 - MISCELLANEOUS ABORT MESSAGES
- \$SET 4 - PROGRAM ERROR ABORT MESSAGES
- \$SET 5 - INTRINSIC ABORT MESSAGES
- \$SET 6 - RUN-TIME ABORT MESSAGES
- \$SET 7 - CI GENERAL MESSAGES
- \$SET 8 - FILE SYSTEM ERROR MESSAGES
- \$SET 9 - LOADER ERROR MESSAGES
- \$SET 10- CREATE ERROR MESSAGES
- \$SET 11- ACTIVATE ERROR MESSAGES
- \$SET 12- SUSPEND ERROR MESSAGES
- \$SET 13- MYCOMMAND ERROR MESSAGES
- \$SET 14- LOCKGLORIN ERROR MESSAGES
- \$SET 15- PRIVATE VOLUMES ERROR MESSAGES
- \$SET 16- DS/3000 ERROR MESSAGES
- \$SET 17- "HELP" ERROR MESSAGES
- \$SET 18- GRAPHIC DEVICES ERRORS/WARNINGS/ADVISORY MSGS.
- \$SET 19- SERIAL DISC ERROR MESSAGES
- \$SET 20- USER LOGGING MESSAGE
- \$SET 21- ASSOCIATE UTILITY
- \$SET 22- PAGE PRINTER MESSAGES

# MESSAGE SET DIRECTORY

DST # IN SYSGLOB %373

CAT DISC ADDR IN SYSGLOB %371-372

CREATED BY RUNNING MAKECAT.PUB.SYS.  
KEPT IN A DATA SEGMENT AND IN A USER LABEL.

| %    | DATA SEGMENT                     | #     |               |
|------|----------------------------------|-------|---------------|
| 0    | MAX. SET #                       | 0 \   | USER<br>LABEL |
| 1    | # OF MESSAGE RECORDS             | 1 /   |               |
| 2    | RECORD OFFSET TO FIRST MESSAGE   | 2 \   |               |
| 3    | FIRST MESSAGE #                  | 3 /   |               |
| 4    | RECORD OFFSET TO FIRST MESSAGE   | 4 \   |               |
| 5    | FIRST MESSAGE #                  | 5 /   |               |
| ~    | EMPTY ENTRY                      | ~     |               |
| ~    |                                  | ~     |               |
| 174  | RECORD OFFSET TO FIRST MESSAGE   | 124 \ |               |
| 175  | FIRST MESSAGE #                  | 125 / |               |
| 176  | 0                                | 126 \ | CUR MSG       |
| 177  | RECORD OFFSET TO CURRENT MESSAGE | 127 / |               |
| 200  | MESSAGE<br>BUFFER<br>(640 WORDS) | 128   | /             |
| ~    |                                  | ~     |               |
| 1400 |                                  | 768   |               |

EMPTY ENTRY:

|                                  |
|----------------------------------|
| RECORD OFFSET OF NEXT IN-USE SET |
| -1                               |

HELP SUBSYSTEM

HELP DIRECTORY

KEPT AS USER LABEL  
 READ ONTO USER'S STACK  
 USES SEARCH INTRINSIC FORMAT  
 VARIABLE ENTRY SIZE

|   |                                                             |  |  |  |       |
|---|-------------------------------------------------------------|--|--|--|-------|
| % |                                                             |  |  |  |       |
| 0 | -----<br>DIRECTORY SIZE (WORDS)<br>-----                    |  |  |  |       |
| 1 | -----<br>ENTRY LGTH (BYTES)   KEYWORD LGTH (BYTES)<br>----- |  |  |  | \     |
| 2 | ENTRY<br>KEYWORD<br>-----<br>1-255 BYTES<br>-----           |  |  |  | ENTRY |
|   | ENTRY RECORD # IN CICAT<br>LEFT BYTE   RIGHT BYTE<br>-----  |  |  |  | /     |
|   | ENTRY LGTH (BYTES)   KEYWORD LGTH (BYTES)<br>-----          |  |  |  | \     |
|   | ENTRY<br>KEYWORD<br>-----<br>1-255 BYTES<br>-----           |  |  |  | ENTRY |
|   | -----<br>  ENTRY REC # LEFT BYTE<br>-----                   |  |  |  |       |
|   | ENTRY REC # R. BYTE   ENTRY LGTH (BYTES)<br>-----           |  |  |  | / \   |
|   | KEYWORD LGTH (BYTES)  <br>-----                             |  |  |  |       |
|   | ENTRY<br>KEYWORD<br>-----<br>1-255 BYTES<br>-----           |  |  |  | ENTRY |
|   | ENTRY REC #<br>LEFT BYTE   RIGHT BYTE<br>-----              |  |  |  | /     |
|   | -----                                                       |  |  |  |       |
|   | -----                                                       |  |  |  |       |

# UDC DIRECTORY

\*EXTRA DATA SEGMENT - DST # IN DB+%250 OF UMAIN STACK

\*BUILT BY INITUDC

|                      |   |   |   |                |   |            |    |
|----------------------|---|---|---|----------------|---|------------|----|
| 0                    | 1 | 2 | 3 | 6              | 7 | 8          | 15 |
| -----                |   |   |   |                |   |            |    |
| LT LN NH NB          |   |   |   | TY             |   | ENTRY SIZE |    |
| -----                |   |   |   |                |   |            |    |
| HEADER RECORD NUMBER |   |   |   |                |   |            |    |
| -----                |   |   |   |                |   |            |    |
| BODY RECORD NUMBER   |   |   |   |                |   |            |    |
| -----                |   |   |   |                |   |            |    |
| FILE NUMBER          |   |   |   | COMMAND LENGTH |   |            |    |
| -----                |   |   |   |                |   |            |    |
| COMMAND NAME         |   |   |   |                |   |            |    |
| NAME                 |   |   |   |                |   |            |    |
| (1-16 BYTES)         |   |   |   |                |   |            |    |
| -----                |   |   |   |                |   |            |    |
| ENTRIES              |   |   |   |                |   |            |    |
| -----                |   |   |   |                |   |            |    |
| 0                    |   |   |   |                |   |            |    |
| -----                |   |   |   |                |   |            |    |

|   |                   |
|---|-------------------|
| \ | LT-OPTION LIST    |
|   | LN-OPTION LOGON   |
|   | NH-OPTION NOHELP  |
|   | NB-OPTION NOBREAK |
|   | TY- 00=USER UDC   |
|   | 01=ACCOUNT UDC    |
|   | 10=SYSTEM UDC     |
| > | ENTRY             |
| / |                   |

|                         |
|-------------------------|
| ENTRY SIZE=0 TERMINATES |
| DIRECTORY               |

UDC'S  
-----

COMMAND.PUB.SYS  
-----

\*RECORD SIZE = 20(10) WORDS, 6 RECORDS/BLOCK

\*KEEPS TRACK OF WHO IS USING WHAT UDC CATALOG

\*CAN BE PURGED TO DISABLE UDC'S

\*CAN BE REBUILT TO REENABLE UDC'S

| %  | RECORD 0         | #  |
|----|------------------|----|
| 0  | 1st FREE ENTRY # | 0  |
| 1  | not used         | 1  |
| 2  | MAX IN USE       | 2  |
| 3  | # IN USE         | 3  |
| 4  | not used         | 4  |
| ~  |                  | ~  |
| 23 |                  | 19 |

| %  | FREE ENTRY        | #  |
|----|-------------------|----|
| 0  | NEXT FREE ENTRY # | 0  |
| 1  | ENTRY TYPE=0      | 1  |
| 2  |                   | 2  |
| ~  | not used          | ~  |
| 23 |                   | 19 |

COMMAND.PUB.SYS (cont.)

| %  | USER ENTRY      | #  | %  | FILE ENTRY        | #  |
|----|-----------------|----|----|-------------------|----|
| 0  | CATALOG ENTRY # | 0  | 0  | NEXT CAT. ENTRY # | 0  |
| 1  | ENTRY TYPE=1    | 1  | 1  | ENTRY TYPE = 2    | 1  |
| 2  | USER*           | 2  | 2  | FILE NAME         | 2  |
| 3  |                 | 3  | 3  | FOPEN FORMAT:     | 3  |
| 4  |                 | 4  | 4  |                   | 4  |
| 5  |                 | 5  | 5  |                   | 5  |
| 6  | ACCOUNT*        | 6  | 6  | FILE              | 6  |
| 7  |                 | 7  | 7  | [/LOCKWORD]       | 7  |
| 10 |                 | 8  | 10 | GROUP             | 8  |
| 11 |                 | 9  | 11 | ACCOUNT           | 9  |
| 12 |                 | 10 | 12 | 0                 | 10 |
| 13 | not used        | 11 | 13 |                   | 11 |
| 14 |                 | 12 | 14 | (UP TO 36 BYTES)  | 12 |
| 15 |                 | 13 | 15 |                   | 13 |
| 16 |                 | 14 | 16 |                   | 14 |
| 17 |                 | 15 | 17 |                   | 15 |
| 20 |                 | 16 | 20 |                   | 16 |
| 21 |                 | 17 | 21 |                   | 17 |
| 22 |                 | 18 | 22 |                   | 18 |
| 23 |                 | 19 | 23 |                   | 19 |

\* IF THE USER FIELD AND THE ACCOUNT FIELD CONTAIN "@\_\_\_\_\_", THIS INDICATES SYSTEM LEVEL UDC'S.

IF ONLY THE USER FIELD CONTAINS @ AND 7 SPACES, THIS INDICATES ACCOUNT LEVEL UDC'S.



# CHAPTER 16    SYSDUMP/INITIAL

CTAB0    (Memory Size Independent Configuration Values)

## RECORD 0 OF CONFDATA FILE

|    |                                             |    |
|----|---------------------------------------------|----|
| 0  | MEMORY SIZE IN K WORDS                      | 0  |
| 1  | CORE SIZE INDEX                             | 1  |
| 2  | STANDARD STACK SIZE                         | 2  |
| 3  | HIGHEST DRT #                               | 3  |
| 4  | TERMINAL BOUND PRIORITY                     | 4  |
| 5  | NORMAL PRIORITY                             | 5  |
| 6  | CPU BOUND PRIORITY                          | 6  |
| 7  | # OF SECONDS TO LOG-ON                      | 7  |
| 10 | LOG FILE RECORD SIZE (SECTORS)              | 8  |
| 11 | LOG FILE SIZE (RECORDS)                     | 9  |
| 12 | LOG FILE #                                  | 10 |
| 13 | LOG BITS (ONLY 11 USED)                     | 11 |
| 14 | <<DEFINES WHAT IS BEING LOGGED>>            | 12 |
| 15 |                                             | 13 |
| 16 |                                             | 14 |
| 17 |                                             | 15 |
| 20 | DEFAULT JOB/SESSION CPU TIME LIMIT          | 16 |
| 21 | FILES DUMPED                                | 17 |
| 22 | HIGHEST LOGICAL DEVICE #                    | 18 |
| 23 | HIGHEST VOLUME #               # OF VOLUMES | 19 |
| 24 | DEVICE CLASS TABLE SIZE                     | 20 |
| 25 | FIX LEVEL                                   | 21 |

RECORD 0 (CONT.)

|                      |                                         |     |
|----------------------|-----------------------------------------|-----|
| 26                   | COLD LOAD COUNT                         | 22  |
| 27                   | MAX INITIAL SEGMENT SIZE                | 23  |
| 30                   | DISC COLD LOAD ENTRY POINT              | 24  |
| 31                   | SIZE OF OLD VOLUME TABLE                | 25  |
| 32                   | SIZE OF OLD INFO TABLE                  | 26  |
| 33                   | TIME QUANTUM (unused)                   | 27  |
| 34                   | MAXIMUM OPEN SPOOL FILES                | 28  |
| 35                   | CSTAB SIZE                              | 29  |
| 36                   | MAXIMUM # OF SPOOL FILES (KILO SECTORS) | 30  |
| 37                   |                                         | 31  |
| 40                   | # OF ADDITIONAL CS DRIVERS              | 32  |
| 41                   | # SECTORS PER SPOOL EXTENT              | 33  |
| 42                   | UPDATE LEVEL                            | 34  |
| 43                   | VERSION                                 | 35  |
| 44                   | SERIAL DISC LOAD                        | 36  |
| 45                   | MIT VERSION                             | 37  |
| 46                   | MIT UPDATE                              | 38  |
| 47                   | MIT FIX                                 | 39  |
| //////////////////// |                                         |     |
| //////////////////// |                                         |     |
| //////////////////// |                                         |     |
| 177                  | RESERVED 124(10)-127(10)                | 127 |

SERIAL DISC LOAD (Word %44)

FD - Date given for sysdump was future date  
SD - Sysdump was to serial disc

# CTAB (Memory Size Dependent Configuration Values)

----

## RECORDS 1-8 OF CONFDATA

-----

| record | memory size k words |
|--------|---------------------|
| 1      | - 64                |
| 2      | - 80                |
| 3      | - 96                |
| 4      | - 128               |
| 5      | - 160               |
| 6      | - 192               |
| 7      | - 224               |
| 8      | - 256 and larger    |

This table describes the  
CTAB format in detail and is  
typical of any record (1-8)

|    |                                         |    |
|----|-----------------------------------------|----|
| 0  | # OF CST ENTRIES                        | 0  |
| 1  | # OF DST ENTRIES                        | 1  |
| 2  | # OF PCB ENTRIES                        | 2  |
| 3  | # OF IOQ ENTRIES                        | 3  |
| 4  | # OF TERMINAL BUFFERS                   | 4  |
| 5  | # OF CST EXTENSION ENTRIES              | 5  |
| 6  | INTERRUPT CONTROL STACK SIZE (Q1 to Z1) | 6  |
| 7  | # UCOP REQUEST QUEUE ENTIREES           | 7  |
| 10 | # BREAKPOINT ENTRIES                    | 8  |
| 11 | # TRL ENTRIES                           | 9  |
| 12 | # LOCAL RINS                            | 10 |
| 13 | # GLOBAL RINS                           | 11 |
| 14 | # OF SYSTEM BUFFERS                     | 12 |
| 15 | # OF CONCURRENT PROGS                   | 13 |
| 16 | # OF MAM TABLE ENTRIES                  | 14 |
|    | ////////////////////////////////////    |    |
|    | ////////////////////////////////////    |    |
|    | ////////////////////////////////////    |    |
| 24 | ////////////////////////////////////    | 20 |

RECORDS 1-8 (CONT.)

|    |                                          |    |
|----|------------------------------------------|----|
| 25 | DIRECTORY SIZE (SECTORS)                 | 21 |
|    | ////////////////////////////////////     | .  |
|    | ////////////////////////////////////     | .  |
|    | ////////////////////////////////////     | .  |
| 36 | MAXIMUM CODE SEGMENT SIZE                | 30 |
| 37 | MAXIMUM # OF CODE SEGMENTS/PROCESS       | 31 |
| 40 | MAXIMUM STACK SIZE (MAXDATA)             | 32 |
| 41 | MAXIMUM EXTRA DATA SEGMENT SIZE          | 33 |
| 42 | MAXIMUM # OF EXTRA DATA SEGMENTS/PROCESS | 34 |
|    | ////////////////////////////////////     | .  |
|    | ////////////////////////////////////     | .  |
|    | ////////////////////////////////////     | .  |
| 50 | MAXIMUM # RUNNING SESSIONS               | 40 |
| 51 | MAXIMUM # OF RUNNING JOBS                | 41 |
| 52 | # LOG PROCS                              | 42 |
| 53 | LOG ID's                                 | 43 |
| 54 | # DISC REQUEST TABLE ENTRIES             | 44 |
| 55 | # SPECIAL REQUEST TABLE ENTRIES          | 45 |
| 56 | # PRIMARY MESSAGE TABLE ENTRIES          | 46 |
| 57 | # SWAP TABLE ENTRIES                     | 47 |

DRIVER TABLE  
-----

The Driver Table consists of 6 word entries, in correspondence to the LDEV entries, up to the highest LDEV used, entry zero is a dummy entry.

|    |        |   |   |   |   |   |             |   |   |    |    |    |    |    |    |                         |
|----|--------|---|---|---|---|---|-------------|---|---|----|----|----|----|----|----|-------------------------|
| 0  | 1      | 2 | 3 | 4 | 5 | 6 | 7           | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |                         |
| DS | DRT #  |   |   |   |   |   | UNIT #      |   |   |    |    |    |    |    |    | TYPICAL ENTRY<br>FORMAT |
| CR | CHAN # |   |   |   |   |   | MASTER LDEV |   |   |    |    |    |    |    |    |                         |
| D  |        |   |   |   |   |   | R           |   |   |    |    |    |    |    |    |                         |
| I  |        |   |   |   |   |   | V           |   |   |    |    |    |    |    |    |                         |
| N  |        |   |   |   |   |   | A           |   |   |    |    |    |    |    |    |                         |
| M  |        |   |   |   |   |   | E           |   |   |    |    |    |    |    |    |                         |
|    |        |   |   |   |   |   |             |   |   |    |    |    |    |    |    |                         |

DS                    DS DEVICE (if set DRT is zero)  
 CR                    CORE RESIDENT  
 CHAN #                CHANNEL #  
 MASTER LDEV          LDEV of device which this DS device is linked to.

Words 2-6 contain the driver name.

# SYSDUMP FORMAT

|                                  |                            |
|----------------------------------|----------------------------|
| READ - SIO - PROGRAM PROGRAM     | <---TAPE LOAD POINT        |
| SIO PROGRAM                      | <---SERIAL DISC LOAD POINT |
| ICS                              |                            |
| LOW CORE                         |                            |
| CS TABLE                         |                            |
| DRIVER TABLE                     |                            |
| LPDT                             |                            |
| LDT                              |                            |
| DEVICE CLASS TABLE               |                            |
| LDTX                             |                            |
| VTAB                             |                            |
| OLDVTAB                          | *                          |
| DISC COLD LOAD INFORMATION TABLE | *                          |
| CTAB                             |                            |
| CTABO                            |                            |
| CSDVR                            |                            |
| CSDEF                            |                            |
| ININ                             |                            |
| TCST                             |                            |
| INITIAL'S DB AREA                |                            |
| STACK MARKER                     |                            |
| INITIAL'S SEGMENTS               |                            |
| RIN TABLE                        | *                          |

\* NOT DUMPED IF DATE =CARRIAGE RETURN

SYSDUMP FORMAT (CONT.)

|                                                 |   |
|-------------------------------------------------|---|
| DIRECTORY HEADER                                | * |
| DIRECTORY                                       | * |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |
| SYSTEM PROGRAMS, SL, NON-STD. DRIVERS           |   |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |
| STORE/RESTORE HEADER                            |   |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |
| STORE/RESTORE DIRECTORY                         | * |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |
| USER FILES (SEPARATED BY "EOF's")               | * |
| STORE/RESTORE TRAILER                           |   |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |   |

\* NOT DUMPED IF DATE = CARRIAGE RETURN

NOTE: ON DISC, READ-SIO-PROGRAM KEPT IN DISC LABEL.

# STORE TAPE FORMAT

## FIRST VOLUME

|                                                    |    |   |                   |
|----------------------------------------------------|----|---|-------------------|
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX | 0  | \ |                   |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX | 13 |   |                   |
| "STORE/RESTORE LABEL -<br>HP/3000."                | 14 |   |                   |
| "VIIB"                                             | 15 |   |                   |
| PARTIAL FIRST FILE FLAG                            | 16 |   |                   |
| CHECKSUM                                           | 17 |   |                   |
| DIRECTORY INDEX OF FIRST FILE                      | 18 |   |                   |
|                                                    | 19 |   | HEADER            |
|                                                    | 22 |   | 40 WORDS          |
| VOLUME NUMBER                                      | 23 |   |                   |
| DATE                                               | 24 |   | DATE:             |
| TIME                                               | 25 |   | 0:7 last 2 digits |
| TAPEBLOCKSIZE (#WORDS/BLOCK;def=4096)              | 26 |   | of year           |
|                                                    | 27 |   | 7:9 Julian date   |
|                                                    | 28 |   | TIME:             |
|                                                    | 29 |   | 25.(0:8) hours    |
|                                                    | 30 |   | (8:8) minutes     |
|                                                    | 31 |   | 26.(0:8) seconds  |
|                                                    | 32 |   | (8:8) .1 secs.    |
|                                                    | 39 |   | /                 |



FIRST VOLUME (CONT.)

|                                                 |
|-------------------------------------------------|
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |
| .                                               |
| .                                               |
| .                                               |
| FILE NAME                                       |
| GROUP NAME                                      |
| ACCT. NAME                                      |
| .                                               |
| .                                               |
| .                                               |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXX |
| FILES (separated by "EOF's")                    |

\  
TYP FILE  
ENTRY  
(12 WDS.)  
/

\  
VOLUME  
DIRECTORY:  
# ENTRIES  
DETERMINED  
BY TAPEBLOCK-  
SIZE  
/

\  
FILES  
/

# STORE FORMAT

## SUBSEQUENT VOLUMES

|                                                    |          |   |                          |
|----------------------------------------------------|----------|---|--------------------------|
| "STORE/RESTORE LABEL-<br>HP/3000."                 | 0<br>13  | \ | HEADER<br>40 WDS.        |
| "VIIB"                                             | 14<br>15 |   |                          |
| PARTIAL FIRST FILE FLAG                            | 16       |   |                          |
| CHECKSUM                                           | 17       |   |                          |
| DIRECTORY INDEX OF FIRST FILE                      | 18       | / | NOTE: NO EOF.            |
|                                                    | 19<br>22 |   |                          |
| VOLUME NUMBER                                      | 23       |   |                          |
| DATE                                               | 24       |   |                          |
| TIME                                               | 25<br>26 | \ | VOLUME<br>DIRECTORY      |
| TAPEBLOCKSIZE                                      | 27       |   |                          |
|                                                    | 28<br>39 |   |                          |
| =====                                              |          |   |                          |
| .                                                  |          | / | FILES                    |
| .                                                  |          |   |                          |
| .                                                  |          |   |                          |
| .                                                  |          |   |                          |
| FILE NAME                                          |          | / | TYPICAL<br>FILE<br>ENTRY |
| GROUP NAME                                         |          |   |                          |
| ACCT NAME                                          |          |   |                          |
|                                                    |          |   |                          |
| .                                                  |          | \ | FILES                    |
| .                                                  |          |   |                          |
| .                                                  |          |   |                          |
| .                                                  |          |   |                          |
| XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX |          | \ | FILES                    |
|                                                    |          |   |                          |
| <FILES><br>(separated by "EOF's")                  |          |   |                          |
|                                                    |          |   |                          |

STORE FORMAT

END OF VOLUME

|                                                           |    |         |
|-----------------------------------------------------------|----|---------|
| <p>&lt;FILES&gt;<br/>(separated by "EOF's")</p>           |    | FILES   |
| <p>XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX</p> |    |         |
| "STORE/RESTORE LABEL-HP/3000."                            | 0  |         |
|                                                           | 13 |         |
|                                                           | 14 |         |
|                                                           | 20 |         |
| FLAG: PRECEDING EOF MARKS FILE ENDED                      | 21 | TRAILER |
| FLAG: PRECEDING EOF MARKS TAPESET ENDED                   | 22 | 40 WDS. |
| VOLUME NO.                                                | 23 |         |
| DATE                                                      | 24 |         |
| TIME                                                      | 25 |         |
|                                                           | 26 |         |
|                                                           | 27 |         |
|                                                           | 39 |         |
| <p>XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX</p> |    |         |
| <p>XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX</p> |    |         |
| <p>XXXXXXXXXXXXXXXXXXXXX EOF XXXXXXXXXXXXXXXXXXXXXXXX</p> |    |         |

### Labeled Tape Subsystem

The MPE labeled tape subsystem permits convenient access to tapes labeled to either ANSI or IBM standards. It operates as a set of subprocedures to the file system.

A labeled tape consists of one or more logical files. Each logical file consists of three physical files, i. e. tape areas delimited by tapemarks. The first physical file contains header labels, the second contains the data, and the third contains trailer labels which are (except for minor differences) copies of the header labels. The tape mark following trailer labels will be followed either by header labels for the next file, or by another tapemark if there is no next file. Labels are 80 bytes long, and conventionally are identified by their first four characters (three letters and a digit) as follows:

**VOL1:** Present only on the first file of a volume, the volume label contains the volume identifier, which is usually the number on the tape strap, and is thus not expected to be changed.

**UVLn:** User volume labels. May be present on tapes from foreign shops, but are not written by MPE. If encountered, they are ignored.

**HDR1:** First header label. Required for each file. Specifies:  
File name, 17 bytes. If the tape was not written on the HP 3000, only the first 8 are significant.

Volume set identifier, 6 bytes. Names the volume on which the set of files begins.

Reel number, 4 digits. Starting with 1, counts the reels containing this file.

File sequence number, 4 digits. Starting with 1, counts the files in the entire set of files.

Creation date, 5 digits. Year and day within year when file was written.

Expiration date, 5 digits. Year and day within year when file may be overwritten without explicit permission.

**HDR2:** Second header label. Although defined by the standard, may be missing on foreign tapes. Contains:

Record format, 1 character: F if fixed length records, U if undefined length, V if variable length records with HP-style 2-byte binary byte count. Foreign tapes may have D for variable 4-byte decimal byte count; these are treated as Undefined since MPE block management can't deal with this format.

Block size, 5 digits. Length in bytes of blocks in data area.

Record size, 5 digits. Length in bytes of records within blocks.  
Significant if fixed-length records.

Lockword, 8 characters. An HP feature.

File type, 1 character. A if ASCII, B if binary. HP feature.

Carriage control, 1 character. C if file is CCTL, else blank.  
HP feature.

User header labels: optional. Standard prescribes UHLn in the first four characters, but MPE doesn't care.

EOV1: End of Volume; used as first trailer label. Required if the logical file is continued onto another reel. Identical to HDR1, except contains the number of physical blocks of data in the data area.

EOV2: Defined by the standard, but may be missing on foreign tapes.  
Follows EOV1; format same as HDR2.

EOF1: End of File; used as first trailer label. Required if this is the end of the logical file. Format same as EOV1.

EOF2: Same as EOV2 except used after EOF1.

User trailer labels: optional. Standard prescribes UTLn in the first four characters, but MPE again doesn't care.

### Tape Label Table

The tape label table is the private playground of the tape label subsystem. It consists of two parts: LDEV Control Blocks (LCBs) and Volume Control Blocks (VCBs). The LDEV area is set up at system initialization and contains one entry for each magnetic tape LDEV in the system. As is common in MPE, the first entry is a dummy which tells where the other things in the table are. The volume area contains one entry for each labeled tape volume requested or active on the system.

Although table entries are stored in an extra data segment, they are generally manipulated via local copies on the stack. The procedures GETLDEV and GETFNUM look for LDEV and volume entries as specified; they copy them to stack buffers and return the DST address for use in copying them back. POSTVTENT copies the entries back, and in the case of a new volume entry, allocates space for it in the volume section of the tape label table.

The overall structure of the TLT is:

TLTDST -- %32,#26

TLTSIR -- %47,#39

| 0                                                                      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |              |
|------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|--------------|
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Table initialization word (=1 when initialized)                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 0            |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Entry size (ESIZE) = %32,#26                                           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 1            |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Table relative pointer to base of LCB entries (LTBASE)                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 2            |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Table relative pointer to base of VCB entries (VTBASE)                 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 3            |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Table relative pointer to top of Volume table (VTTOP)                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 4            |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Size of Tape Label Table, in words (VTMAX)                             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 5            |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 6            |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 7            |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 10           |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| not used                                                               |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 30           |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 31           |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | 32 <- LTBASE |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| LDEV Control Block area -- one entry/mag tape drive                    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | <- VTBASE    |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Volume Control Block table -- contains VCB entries<br>and free entries |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
|                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    | <- VTTOP     |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| Area available for expansion of VCB table                              |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| ~                                                                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |
| -----                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |              |



Type: 00 = no tape mounted

01 = unlabelled

10 = ANSI

11 = IBM

L: 1 if file has lockword.

B: 1 if tape is from Burroughs, which has incorrect block/record size in the HDR2 label. Code can be patched to correct the size.

HP: 1 if tape is Hewlett-Packard ANSI format.

VCB address: Pointer to VCB entry describing volume mounted on tape drive, only if linked. Otherwise, 0.



The VCB format is:

| 0                       | 1 | 2 | 3 | 4        | 5 | 6 | 7      | 8      | 9 | 10 | 11 | 12 | 13 | 14 | 15 |    |
|-------------------------|---|---|---|----------|---|---|--------|--------|---|----|----|----|----|----|----|----|
| A                       | F |   |   | Position |   | W | SeqTyp | LblTyp | L | M  | R  | B  |    |    |    | 0  |
| LDEV #                  |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 1  |
| PIN                     |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 2  |
| File number (AFT index) |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 3  |
| File sequence number    |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 4  |
| S                       | R | D |   | Density  |   | V |        |        |   |    |    |    |    |    |    | 5  |
| Expiration date         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 6  |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 7  |
| File name               |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 10 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    |    |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    |    |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 16 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 17 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    |    |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 20 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 21 |
| Lockword                |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 22 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 23 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 24 |
| Volume set identifier   |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 25 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 26 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 27 |
| Volume name             |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 30 |
|                         |   |   |   |          |   |   |        |        |   |    |    |    |    |    |    | 31 |

A: ASCII FOPTION

F: Flush bit - operator did REPLY <pin>,0.

Position: Gives head position within logical file.

- 0 = at load point (LDPNT)
- 1 = HDR1 label next (H1NX)
- 3 = after HDR2 label (AH2)
- 4 = after user header labels (AHU)
- 6 = data next (DNX)
- 7 = after data (AD)
- 8 = EOF1/EOV1 label next (T1NX)
- 10 = after EOF2/EOV2 label (AT2)
- 11 = after user trailer labels (ATU)

W: Write access specified.

SeqTyp: File open sequencing type.

- 0 = match filename
- 1 = NEXT
- 2 = ADDF
- 3 = use file sequence number

LblTyp: As in LCB entry.

L: Linkwait - mark left by CREATETLTENT for LINKLABEL.

M: Mount wait - waiting for operator to mount tape on FOPEN.

R: Reelswitch wait - waiting for next reel.

B: Busy bit - this entry is in use.

LDEV #: Logical device number of tape drive with this volume, only if linked. Otherwise, 0.

S: STORE tape.

R: REELSWITCH has been done. Used by STORE/RESTORE to handle STORE label and directory file.

D: Next file is directory. Used by STORE.

Density: volume set density. During a volume set open, contains the density requested by the user in FOPEN. Once the volume set is open, contains the actual density of the volume set. Only valid for tapes on variable density tape drives.

- 0 = default density for volume set open
- 1 = 1600 BPI
- 2 = 6250 BPI

V: 1 if volume set is being opened. Reset after completion of FOPEN.

## Volume Recognition

Volume recognition is the responsibility of DEVREC, which reads the first record of a newly-mounted tape on an unowned drive and passes the record to AVREC. AVREC may see:

VOLL in the first 4 bytes, in ASCII, in which case the tape is ANSI;  
VOLL in the first 4 bytes, in EBCDIC, in which case the tape is IBM;  
Anything else, in which case the tape is considered unlabelled.

If the tape is unlabelled, AVREC reports to DEVREC that no further action is required. If the tape is labelled, AVREC wants to see the first HDR1 label, so asks DEVREC to read another record. (Unfortunately, DEVREC cannot be stopped long enough for AVREC to do its own read.) When the HDR1 record is found, the volume entries can be searched to see if there is a pending request for this volume. If so, the waiting process is restarted.

If the system has been restarted with tapes mounted, there will not be interrupts to alert DEVREC. The procedure RECOGNIZE is called when needed to see if any such tapes exist.

## Opening a File

FOPEN gets into the tape label code in three different places. The first is to call CREATETLTENT, which parses the string passed in the FORMSMMSG parameter to identify the labeled tape file required. If there is no existing corresponding entry in the volume area, this is a volume set open, and a new volume entry is created. There may be an existing entry (if the tape was FOPENed and FCLOSEd with disposition 2 or 3), in which case there is an associated LDEV entry for the drive on which the tape was left mounted by the prior operation; in this case, the new information is stuffed into the existing volume entry. A bit (LINKWAIT) is left set to mark the entry for LINKLABEL.

The second entry is through LINKLABEL, which is called from ALLOCATE. At this time, it is necessary to identify the LDEV to be used for the tape. If no LDEV is associated, the LDEV entries are searched to see if the operator has already mounted the required tape; if so, the volume and LDEV entries are crosstied and LINKLABEL is done. If the search turns up nothing suitable, the operator is requested to mount the appropriate tape, and the procedure waits for either a REPLY or for AVREC to discover the appearance of a suitable tape and restart the process. If the operator enters a reply, it is validated.

The third entry is through POSITION, which is responsible for positioning the tape to the requested file. At the file, the HDR1 and HDR2 label are examined as required to determine the file characteristics.

## Reading and Writing Files

All procedures which move tape go through the catchall procedure CHECKUL, which takes care of necessary labeled tape doings. The code insures that the sequence: header labels (including user

labels), data, trailer labels (including user labels) is maintained. There is a separate CASE leg for each such procedure.

If an EOT reflective mark or an EOF in data is found, REELSWITCH is called (principally from the file system procedure IOMOVE) to call for the next reel, if any. If another reel is needed, the tape drive is set Unowned so that AVREC will be called to recognize the new tape when it is mounted. REELSWITCH returns to its caller when it is satisfied that an appropriate tape is mounted.

#### Closing Files

FCLOSE calls CHECKUL to handle writing EOF1 and EOF2 if needed and resolving the tape position. If the disposition is 3, the tape is left positioned at the next file. If the disposition is 2, the tape is supposed to be left at the beginning of the current file, but the code does not presently provide for reelswitching if the present file began on a prior reel. (Someday we'll get an SR on this.)

At present, ensuing volumes of a multi-volume set must be mounted on the same drive as the first, mostly because neither the file system nor STORE-RESTORE was capable of dealing with LDEV changes in the middle of a file. REELSWITCH reports the LDEV being used, however, so that the capability of using a different LDEV can be added in the future.

#### STORE-RESTORE

Complications ensue on labeled STORE-RESTORE tapes because there needs to be a file directory at or near the beginning of each tape of a multi-volume set; RESTORE uses this directory to determine whether the specified file(s) can exist on this tape. Because the reel switching process would otherwise be invisible to STORE-RESTORE, special bits (VCB'RSWDONE and VCB'WRITDIR) are kept to enable special intrinsics callable by STORE-RESTORE to report whether a directory needs to be written or is about to be encountered.

The special procedure NEXTTAPEFILE is used by STORE-RESTORE in lieu of doing a FCLOSE(,3) followed by an FOPEN to get to the next file. This permits cleaner handling of both REPLY 0 and Forward Space (logical) File over a Reelswitch, as well as saving the time needed to tear down and reconstruct all the control blocks.

#### Miscellany

PVOLID is used by the SHOWDEV command processor (in SPOOLCOMS) to obtain the name of the volume on the specified drive without having to know the structure of the tape label table. For the same reason, TGETINFO is used by the FFILEINFO intrinsic (in FILEIO) to get labeled tape information.

$$DST = 30(10) = 36$$

- 1) PCB BREAKPOINT EXTENSION TABLE (PCB'BKPT'EXT)  
This table contains the heads of the breakpoint chains
- 2) BREAKPOINT ENTRY TABLE (BKPT'ENTRY'TAB)  
This table contains the actual entries

Diagram illustrating the structure of **PCB(7).(8:8)**.

The structure is divided into three main sections:

- PCB' BKPT' EXT** (Top section)
- BKPT' ENTRY' TAB** (Middle section, containing a table of 16 entries, each 14 bits long, indicated by the header **14:15** and the label **%11** in the legend).
- SYS GLOBAL** (Bottom section, containing a global system break point table, indicated by the label **%11** in the legend).

**Legend:**

- L** = Table locked
- S** = System break points exist

# PCB BREAKPOINT EXTENSION TABLE

|                     |                                |
|---------------------|--------------------------------|
| # ENTRIES           | ENTRY SIZE = 1                 |
| HEAD SYSTEM LIST    | FREE ENTRY = 0                 |
| # USED USER ENTRIES | ACTIVE ENTRY = Index 1st Entry |
|                     | in breakpoint                  |
| ~ USER ENTRIES ~    | chain                          |
|                     |                                |
|                     |                                |
|                     |                                |

# BREAKPOINT ENTRY TABLE

| ENTRY (0) |                        | FREE ENTRY |               |
|-----------|------------------------|------------|---------------|
| 0         | # WORDS BREAKPOINT TAB | 1:         | SIZE          |
| 1         | HEAD FREE LIST         |            | FORWARD LINK  |
| 2         | UNUSED                 |            | BACKWARD LINK |
| 3         |                        |            |               |
| 4         |                        |            |               |
|           |                        |            |               |
|           | LAST ENTRY             |            |               |
| 0         | 1                      |            |               |

The breakpoint entry table consists of variable length entries  
The minimum entry size is 5.

## ACTIVE ENTRY

| 0 1:2:3 4:5:6 7:8:9 0:1:2 3:4:5 |                             |
|---------------------------------|-----------------------------|
| 0                               | 0 P:L:V D:F:T U:P:C U: SIZE |
| 1                               | : : : : :M:  P:             |
| 1                               | BLOCKLABEL                  |
| 2                               | PLOC                        |
| 3                               | INSTRUCTION                 |
| 4                               | LINK                        |
|                                 | USERLABEL                   |
|                                 | CONDITION/COUNT             |
|                                 | COND DESCRIPTOR             |

variable

# BREAKPOINT ENTRY TABLE (CONT.)

|                       |                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------|
| ENTRY(0).(0:1) = FR:  | FREE ENTRY<br>1 = FREE<br>0 = USED                                                            |
| ENTRY(0).(1:1) = P:   | PRIVILEGED MODE BREAKPOINT<br>1 = PRIV.<br>0 = NON-PRIV                                       |
| ENTRY(0).(2:1) = L:   | PROCESS-LOCAL BREAKPOINT<br>1 = PROCESS-LOCAL<br>0 = SYSTEM                                   |
| ENTRY(0).(3:1) = V:   | VALIDATION BIT<br>1 = INSTRUCTION IN ENTRY(3)<br>0 = INSTRUCTION NOT IN TAB.                  |
| ENTRY(0).(4:1) = D:   | DOUBLE TRAP<br>1 = BREAKPOINT OSCILLATES BETWEEN<br>P/P+1<br>0 = NOT DOUBLE TRAP              |
| ENTRY(0).(5:1) = F:   | FAKE 'DUMMY' TRAP<br>1 = BREAKPOINT AT P+1<br>0 = BREAKPOINT AT P (ORIG. LOC)                 |
| ENTRY(0).(6:1) = T:   | TWO WORD INSTRUCTION<br>1 = TWO WORD INSTRUCTION<br>0 = NOT TWO WORD INSTRUCTION              |
| ENTRY(0).(7:1) = U:   | USER LABEL PRESENT<br>1 = TRAP TO USER SUPPLIED LABEL<br>0 = TRAP TO DEBUG                    |
| ENTRY(0).(8:1) = PM:  | PERMANENT BREAKPOINT<br>1 = PERM<br>0 = TEMPORARY                                             |
| ENTRY(0).(9:1) = C:   | CONDITION/COUNT<br>1 = CONDITION/COUNT SPECIFIED<br>0 = NO COND/COUNT                         |
| ENTRY(0).(10:1) = UP: | UPDATING<br>1 = ENTRY IN PROCESS OF BEING<br>UPDATED/REMOVED<br>0 = NOT BEING UPDATED/REMOVED |
| ENTRY(4) = LINK:      | LINK<br>0 = END OF CHAIN<br>>0= INDEX NEXT ENTRY                                              |



# BREAKPOINT ENTRY TABLE (CONT.)

| COUNT |               | CONDITION |                  |
|-------|---------------|-----------|------------------|
| 1)    | ORIGINAL CNT. | 2)        | OPERAND1         |
|       | # OF HITS     |           | OPERAND2         |
|       | 1             |           | OPT1 OPT2  RELOP |

RELOP -> (8:8) RELOP NUMBER:

3 = LT      9 = LTE  
4 = GT      10 = GTE  
5 = EQ      11 = NEQ

OPT1 -> (0:2) OPERAND1'S TYPE

OPT2 -> (2:2) OPERAND2'S TYPE

OPERAND TYPES:

0 -> CONSTANT (SINGLE WORD)  
1 -> ADDRESS (DOUBLE WORD)  
3 -> INDIRECT ADDRESS (TRIPLE WORD)

OPERAND FORMS:

CONSTANT -> -----  
| CONST |  
-----

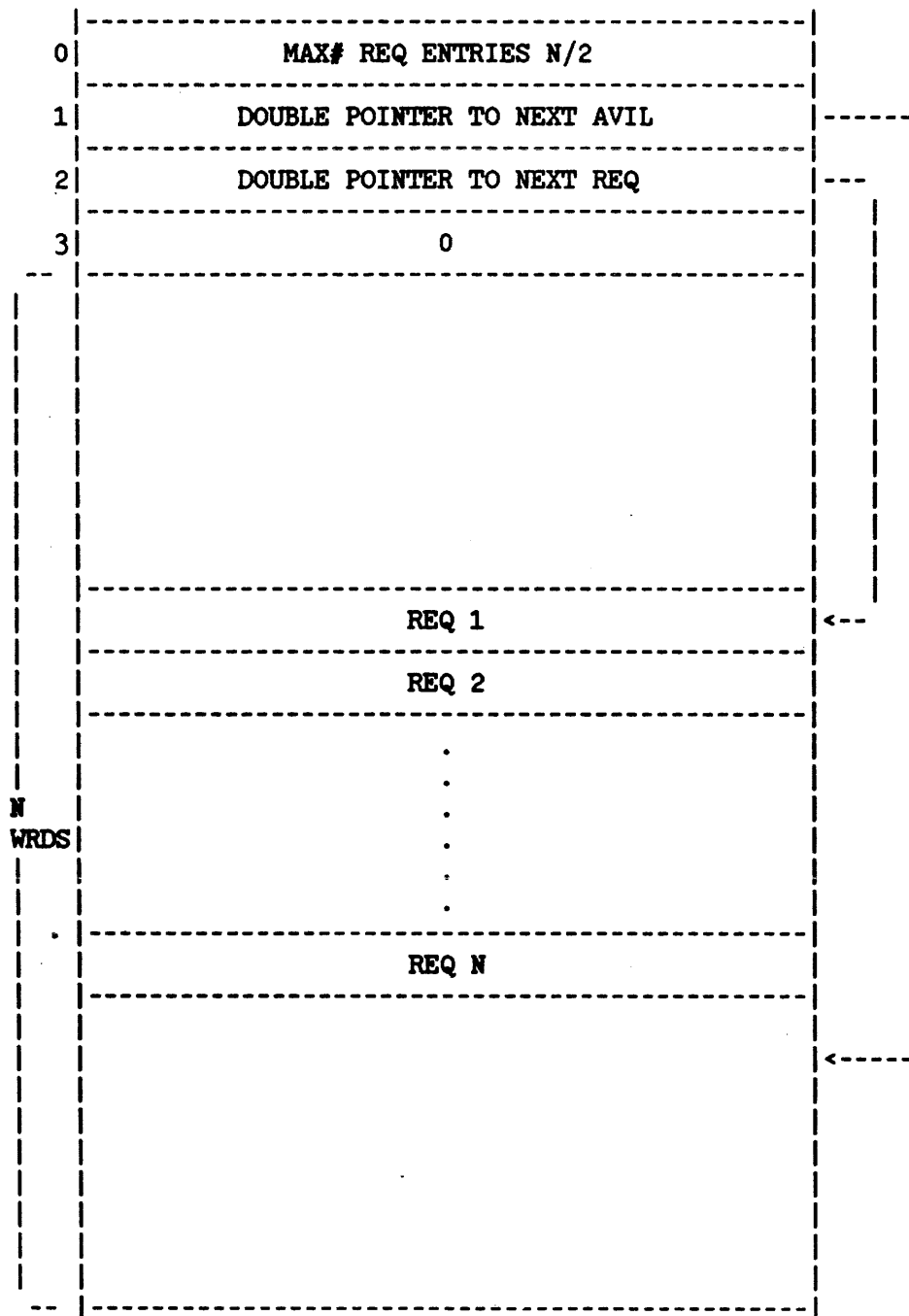
ADDRESS -> -----  
| REG | BASE |  
-----  
| OFFSET |  
-----  
| IND. OFFSET | (TYPE 3 ONLY)  
-----

REG -> (0:6) CORRESPONDING INDEX INTO 'REGY':

3 = A      10 = DL  
4 = SY      11 = Q  
7 = DA      12 = S  
8 = DX      17 = EA  
9 = DB

BASE -> (6:10) SEG #/BANK #

# UCOP REQUEST QUEUE (DST#9)



# UCOP ENTRY FORMAT

## Request Codes

|              |       |       |
|--------------|-------|-------|
| 0            | 12-15 |       |
|              | 2     |       |
|              | PIN   |       |
| 0-7          | 8-15  |       |
| 0            | 7     | 12-15 |
| RANK SQ      |       | 3     |
| NEW PRIORITY | PIN   |       |
| 0            | 8     | 12-15 |
| + - #SECTORS |       | 4     |
|              | PIN   |       |
| 0            | 8     | 12-15 |
| + - #SECTORS |       | 5     |
|              | PIN   |       |
| 0            | 8     | 12-15 |
| + - #SECTORS |       | 6     |
|              | PIN   |       |

- 0 null
- 1 null
- 2 process deletion
- 3 priority change
- 4 DL change
- 5 Z change
- 6 PCBX size change

# TIMER REQUEST LIST (TRL)

The system clock interrupts every 100 ms, with the CR being automatically cleared. An exception is the Shared Clock Interface measurement service which allows rates as fast as 5 ms. The interrupt handler is the procedure TICK. On entry, DB is pointing to the base of timer request list. Besides timeout requests, the clock also controls time slicing.

|                          |      |                                                      |               |                    |
|--------------------------|------|------------------------------------------------------|---------------|--------------------|
|                          | / 0  | FREE LIST PTR                                        |               |                    |
| ENT0                     | 1    | NR ENTRIES                                           | ENTRY SIZE(4) |                    |
|                          | 2    | TRACE WORD                                           |               |                    |
|                          | \ 3  | # of days since last start                           |               | Series 30/33 only  |
|                          | / 4  | QUANTUM/100 ms                                       |               | QTIME              |
| ENT1                     | 5    | TIME OF DAY*                                         |               | DTIME*             |
|                          | 6    |                                                      |               |                    |
|                          | \ 7  | YEAR                                                 | JULIAN DAY    |                    |
|                          | / 8  | PTR TO MOST ACTIVE REQUEST                           |               | HEAD               |
| ENT2                     | 9    | 0                                                    |               |                    |
|                          | 10   | 0                                                    |               |                    |
|                          | \ 11 | 0                                                    |               | dummy time         |
|                          | / 12 | A  CODE                                              | PTR TO NEXT   |                    |
| ENT3                     | 13   | REQ                                                  |               |                    |
|                          | \    | TIME TO SERVICE AFTER REQUEST IN FRONT (UNIT= 100ms) |               | assignable entries |
|                          |      |                                                      |               |                    |
| A: 0 if inactive request |      |                                                      |               |                    |
| 1 if active request      |      |                                                      |               |                    |

TRL (CONT.)

---

CODE & REQ indicate the type of request.

| CODE: | REQ:                     | TYPE:                                |
|-------|--------------------------|--------------------------------------|
| 0     | DITP                     | Hangup                               |
| 1     | DITP                     | Carrier failure                      |
| 2     | DITP                     | 202 turnaround                       |
| 3     | DITP                     | Read                                 |
| 4     | DITP                     | Logon                                |
| 5     | PCBB index<br>to process | Delay                                |
| 6     | DITP                     | LP not ready                         |
| 7     | DITP                     | 2640                                 |
| %10   | Port mask                | Msg port timeout                     |
| %11   | DITP                     | Block mode read<br>timeout (30 secs) |
| %12   | PCBB index<br>to process | Watchdog timer for<br>process        |

The list of pending requests is kept ordered by time with later entries at the tail.

|         |      |                                                                               |
|---------|------|-------------------------------------------------------------------------------|
| %20-%37 | DITP | SIO device timeout:<br>DIT8. (code 1 on<br>expiration, cleared<br>on Timereq. |
|---------|------|-------------------------------------------------------------------------------|

|       |        |                                                                               |
|-------|--------|-------------------------------------------------------------------------------|
| %5/%6 | *DTIME | For Series 30/33, DTIME is<br># of TICS (0.091457 ms)<br>since last midnight. |
|-------|--------|-------------------------------------------------------------------------------|

# USER LOGGING TABLE

ENTRY SIZE = 36  
DST %33

## FIRST ENTRY

|     |                      |  |
|-----|----------------------|--|
| 0.  | NUMBER OF ENTRIES    |  |
| 1.  | FREE ENTRY HEAD PT.  |  |
| 2.  | INUSE ENTRY HEAD PT. |  |
| 3.  | NEXT BUFFER NUMBER   |  |
| 4.  |                      |  |
| 5.  |                      |  |
| 6.  |                      |  |
| 7.  |                      |  |
| 8.  |                      |  |
| 9.  |                      |  |
| 10. |                      |  |
| 11. |                      |  |
| 12. |                      |  |
| 13. |                      |  |
| 14. |                      |  |
| 15. |                      |  |
| 16. |                      |  |
| 17. |                      |  |
| 18. |                      |  |
| 19. |                      |  |

USER LOGGING TABLE (CONT)

|     |  |  |
|-----|--|--|
| 20. |  |  |
| 21. |  |  |
| 22. |  |  |
| 23. |  |  |
| 24. |  |  |
| 25. |  |  |
| 26. |  |  |
| 27. |  |  |
| 28. |  |  |
| 29. |  |  |
| 30. |  |  |
| 31. |  |  |
| 32. |  |  |
| 33. |  |  |
| 34. |  |  |
| 35. |  |  |

# USER LOGGING TABLE (CONT)

-----

|            |   |           |
|------------|---|-----------|
| NUMENTRIES | = | LOGTAB    |
| FREE       | = | LOGTAB(1) |
| INUSE      | = | LOGTAB(2) |
| BUFNUM     | = | LOGTAB(3) |

## NUMENTRIES

The number of entries in the logging table.

## FREE

A table relative pointer to the first free entry in the logging table.

## INUSE

A table relative pointer to the first entry in the logging table that is being used.

## BUFNUM

The number of the buffer associated with this logging process.



# USER LOGGING TABLE (CONT)

## TYPICAL ENTRY

|     |   |            |
|-----|---|------------|
| 0.  |   |            |
| 1.  | - | LOGGING    |
| 2.  | - | IDENTIFIER |
| 3.  | - |            |
| 4.  |   |            |
| 5.  | - | BUFFER     |
| 6.  | - | NAME       |
| 7.  | - |            |
| 8.  |   |            |
| 9.  | - | PASS       |
| 10. | - | WORD       |
| 11. | - |            |
| 12. |   |            |
| 13. | - |            |
| 14. | - |            |
| 15. | - | LOG        |
| 16. | - |            |
| 17. | - | FILE       |
| 18. | - |            |
| 19. | - | NAME       |

# USER LOGGING TABLE (CONT)

|     |                 |        |
|-----|-----------------|--------|
| 20. |                 |        |
| 21. |                 |        |
| 22. |                 |        |
| 23. |                 |        |
| 24. |                 |        |
| 25. | NUMBER OF USERS |        |
| 26. | BUFFER          | DST NO |
| 27. | LOG             | TYPE   |
| 28. | LOG             | DEV    |
| 29. | LOG             | PCB #  |
| 30. | SPARE           |        |
| 31. | SPARE           |        |
| 32. | LOG STATUS      |        |
| 33. | FWRD ENTRY PT   |        |
| 34. | BKWRD ENTRY PT  |        |
| 35. |                 |        |

# USER LOGGING TABLE (CONT)

|                |   |                               |
|----------------|---|-------------------------------|
| TABINDEX       |   |                               |
| TABINDEX       | = | WORD INDEX TO CURRENT ENTRY   |
| BTABINDEX      | = | BYTE INDEX TO CURRENT ENTRY   |
| DTABINDEX      | = | DOUBLE INDEX TO CURRENT ENTRY |
| LGNAME         | = | BTABINDEX                     |
| BNAME          | = | BTABINDEX+8                   |
| PWORD          | = | BTABINDEX+16                  |
| LFGROUP        | = | BTABINDEX+32                  |
| LFACCT         | = | TABINDEX+40                   |
| NUMUSERS       | = | TABINDEX+24                   |
| DST            | = | TABINDEX+25                   |
| LGTYPE         | = | TABINDEX+27                   |
| 0 = TAPE       |   |                               |
| 1 = DISC       |   |                               |
| LGDEV          | = | TABINDEX+28                   |
| PIN            | = | TABINDEX+29                   |
| STATUS         | = | TABINDEX+26                   |
| ACT = 1        |   |                               |
| INACT = 0      |   |                               |
| RECOVERING = 2 |   |                               |
| NEXT           | = | TABINDEX+36                   |
| PREV           | = | TABINDEX+37                   |

## LGNAME

The name of the logging process (logging identifier).

## BNAME

The name of the disc buffer used if the logging process destination file is a tape file. This is a file that resides in PUB.SYS. The format of the name is ULOGxxxx where xxxx is the buffer number padded on the left with zeroes.

## PWORD

The password of the logging identifier.

## LFGROUP

The group that the destination logging file resides in if the file is a disc file.

## LFACCT

The account that the destination logging file resides in if the file is a disc file.

USER LOGGING TABLE (CONT)

-----

NUMUSERS

The number of users currently accessing the logging file.

DST

The dst number of the logging data segment.

LGTYPE

The type of destination file of the logging process. Either disc or tape.

LGDEV

The logical device number of the destination file.

PIN

The process identification number for the logging process.

STATUS

The status of the logging process

NEXT

A table relative pointer to the next entry in the logging table.

PREV

A table relative pointer to the previous entry in the logging table.

**USER LOGGING BUFFER**

**ENTRY SIZE = 25**

| COMMUNICATIONS AREA |     |     |
|---------------------|-----|-----|
| ENTRY #2            | FPT | BPT |
| ENTRY #3            | FPT | BPT |
| ENTRY #4            | FPT | BPT |
|                     |     |     |
| ENTRY #N            | FPT | BPT |
|                     |     |     |
| BUFFER AREA         |     |     |
| 4K WORDS            |     |     |

# USER LOGGING BUFFER (CONT)

## ENTRY #0

|     |          |
|-----|----------|
| 0.  | LOG      |
| 1.  | ADDRESS  |
| 2.  | INPUT    |
| 3.  | RECORD   |
| 4.  | FILE     |
| 5.  | SIZE     |
| 6.  | FILE     |
| 7.  | SPACE    |
| 8.  | TOTAL    |
| 9.  | RECORDS  |
| 10. |          |
| 11. | LOG FILE |
| 12. | NAME     |
| 13. |          |
| 14. |          |
| 15. | SPARE    |
| 16. | SPARE    |
| 17. | SPARE    |
| 18. | SPARE    |
| 19. | SPARE    |
| 20. | SPARE    |

# USER LOGGING BUFFER (CONT)

|     |       |
|-----|-------|
| 21. | SPARE |
| 22. | SPARE |
| 23. | SPARE |
| 24. | SPARE |

## ENTRY #1

|     |                  |
|-----|------------------|
| 0.  | NUMBER OF USERS  |
| 1.  | LOGGING DEVICE # |
| 2.  |                  |
| 3.  | BUFFER SPACE     |
| 4.  | SLEEP COUNT      |
| 5.  | NEXT USER NUMBER |
| 6.  | LOG PROCESS PIN  |
| 7.  |                  |
| 8.  | BUFFER NUMBER    |
| 9.  | LOGGING TYPE     |
| 10. | IN USE HEAD PT   |
| 11. | FREE HEAD PT     |
| 12. | OPERATOR MSG     |
| 13. | LOG PROCESS MSG  |
| 14. | USER PROCESS MSG |
| 15. | MAX USERS        |

# USER LOGGING BUFFER (CONT)

|     |          |
|-----|----------|
| 16. | RESOURCE |
| 17. |          |
| 18. |          |
| 19. | SPARE    |
| 20. | SPARE    |
| 21. | SPARE    |
| 22. | SPARE    |
| 23. | SPARE    |
| 24. | SPARE    |

## WORD ENTRIES

|          |   |             |
|----------|---|-------------|
| LOGADDR  | = | LOGBUFF(0)  |
| LOGTYPE  | = | LOGBUFF(23) |
| DISC = 0 |   |             |
| TAPE = 1 |   |             |
| STATE    | = | LOGBUFF(23) |
| NUMUSERS | = | LOGBUFF(25) |
| LOGDEV   | = | LOGBUFF(26) |
| BSPACE   | = | LOGBUFF(28) |
| BNUM     | = | LOGBUFF(33) |
| SLPCT    | = | LOGBUFF(29) |
| USERNO   | = | LOGBUFF(30) |
| LOGPIN   | = | LOGBUFF(31) |
| TYPE     | = | LOGBUFF(34) |
| UHEAD    | = | LOGBUFF(35) |
| FHEAD    | = | LOGBUFF(36) |
| MSG      | = | LOGBUFF(37) |
| INMSG    | = | LOGBUFF(39) |
| OUTMSG   | = | LOGBUFF(38) |
| MAXUSERS | = | LOGBUFF(40) |



## USER LOGGING BUFFER (CONT)

-----

### DOUBLE ENTRIES

|          |   |              |
|----------|---|--------------|
| INBUFREC | = | DLOGBUFF(1)  |
| FSIZE    | = | DLOGBUFF(2)  |
| FSPACE   | = | DLOGBUFF(3)  |
| TRECS    | = | DLOGBUFF(4)  |
| RESOURCE | = | DLOGBUFF(21) |

### BYTE ENTRIES

|             |   |              |
|-------------|---|--------------|
| LOGFILENAME | = | BLOGBUFF(20) |
|-------------|---|--------------|

#### LOGADDR

The disc address of the logging destination file if the file is on disc. If the file is on tape, this is the disc address of the disc buffer for the file.

#### INBUFREC

The record number of the next block to be written to the logging destination file or the disc logging buffer for tape file.

#### LOGTYPE

The type of destination file for the logging process. This can be disc or tape.

#### STATE

The state of the user process accessing the logging file. This can be either active or inactive.

#### NUMUSERS

The number of users currently accessing the logging file.

#### LOGDEV

The logical device number of the destination logging file.

#### FSIZE

The current extent size of the logging destination file or disc logging buffer file for tape destination files.

## USER LOGGING BUFFER (CONT)

-----

### BSPACE

The amount of space in records that remains in the memory logging buffer.

### BNUM

The buffer number of the disc buffer for tape destination logging files.

### FSPACE

The space in records that remains in the current extent of the disc logging destination file or disc buffer for tape destination files.

### SLPCT

The number of users accessing the logging file that are waiting to be activated by the logging process.

### USERNO

The next sequential number to be assigned users accessing the system.

### LOGPIN

The process identification number for the logging process that services request for this logging file.

### LOGFILENAME

### TRECS

The total number of records written to the logging destination file.

### UHEAD

A table relative pointer to the first entry into the logging data segment

### FHEAD

A table relative pointer to the first free entry in the logging data segment.

### MSG

A message word for messages coming from the operator.

USER LOGGING BUFFER (CONT)

-----

**INMSG**

A message word for messages coming from the user process.

**OUTMSG**

A message word for sending messages to the user process.

**RESOURCE**

A double word used for resource management through the procedures obtain and release.

**MAXUSERS**

The maximum number of users allowed to access the logging file.

# TYPICAL LOGBUFF ENTRY

|     |            |
|-----|------------|
| 0.  |            |
| 1.  | LOGGING    |
| 2.  | IDENTIFIER |
| 3.  |            |
| 4.  |            |
| 5.  | USER       |
| 6.  | NAME       |
| 7.  |            |
| 8.  |            |
| 9.  | GROUP      |
| 10. |            |
| 11. |            |
| 12. |            |
| 13. | ACCOUNT    |
| 14. |            |
| 15. |            |
| 16. | TOTAL      |
| 17. | RECORDS    |
| 18. | WAIT STATE |
| 18. | USER PCB # |
| 19. | LOG NUMBER |
| 20. | ERROR CODE |

# TYPICAL LOGBUFF ENTRY (CONT)

|     |                |
|-----|----------------|
| 21. | SUBSYSTEM CODE |
| 22. | FRWD ENTRY PT  |
| 23. | BKWRD ENTRY PT |
| 24. |                |

|           |   |                               |
|-----------|---|-------------------------------|
| BINDEX    | = | BYTE INDEX TO CURRENT ENTRY   |
| INDEX     | = | WORD INDEX TO CURRENT ENTRY   |
| DINDEX    | = | DOUBLE INDEX TO CURRENT ENTRY |
| LOGID     | = | BINDEX                        |
| USER      | = | BINDEX+8                      |
| GROUP     | = | BINDEX+16                     |
| ACCT      | = | BINDEX+24                     |
| RECS      | = | DINDEX+8                      |
| WSTATE    | = | INDEX+18                      |
| 0 = INACT |   |                               |
| 1 = ACT   |   |                               |
| UPIN      | = | INDEX+19                      |
| LGNUM     | = | INDEX+20                      |
| ERROR     | = | INDEX+21                      |
| SCODE     | = | INDEX+22                      |
| NENTRY    | = | INDEX+23                      |
| PENTRY    | = | INDEX+24                      |

## LOGID

The name of the logging identifier for the logging process.

## USER

The name of the user who opened the logging file through this entry.

## GROUP

The group of the user who open the logging file.

## TYPICAL LOGBUFF ENTRY (CONT)

-----

### ACCT

The account of the user who open the logging file.

### RECS

The number of records written by this user.

### WSTATE

The wait status of the users process. This is either waiting or not waiting

### UPIN

The process identification number for the user's process.

### LGNUM

The logging number assigned to the user.

### ERROR

Used to hold error information for this user.

### SCODE

The subsystem code for the caller. This applies only to privileged callers.

### NENTRY

A table relative pointer to the next entry in the logging data segment .

### PENTRY

A table relative pointer to the previous entry in the logging data segment.

# LOGGING IDENTIFIER TABLE

ENTRY SIZE = 33  
DST %41

ENTRY #0

|     |            |
|-----|------------|
| 0.  |            |
| 1.  | LOGGING    |
| 2.  | IDENTIFIER |
| 3.  |            |
| 4.  |            |
| 5.  | PASSWORD   |
| 6.  |            |
| 7.  |            |
| 8.  |            |
| 9.  | FILE       |
| 10. | NAME       |
| 11. |            |
| 12. |            |
| 13. | FILE       |
| 14. | LOCK WORD  |
| 15. |            |
| 16. |            |
| 17. | FILE       |
| 18. | GROUP      |

# LOGID TABLE (CONT)

|     |              |
|-----|--------------|
| 19. |              |
| 20. |              |
| 21. | FILE         |
| 22. | ACCOUNT      |
| 23. |              |
| 24. |              |
| 25. | USER'S       |
| 26. | NAME         |
| 27. |              |
| 28. |              |
| 29. | USER'S       |
| 30. | ACCOUNT      |
| 31. |              |
| 32. | ENTRY STATUS |

## WORD ENTRIES

NENTRIES = LIDTAB(0)  
 MENTRIES = LIDTAB(1)  
 FENTRIES = LIDTAB(2)



## LOGID TABLE (CONT)

-----

### BYTE ENTRIES

|        |   |             |
|--------|---|-------------|
| LID    | = | BLIDTAB     |
| PW     | = | BLIDTAB(8)  |
| FNAME  | = | BLIDTAB(16) |
| LW     | = | BLIDTAB(24) |
| FGROUP | = | BLIDTAB(32) |
| FACCT  | = | BLIDTAB(40) |
| UNAME  | = | BLIDTAB(48) |
| UACCT  | = | BLIDTAB(56) |

### NENTRIES

The number of entries in the table.

### MENTRIES

The maximum number of entries in the table.

### FENTRIES

The number of free entries in the table.

### LID

The logging identifier name. This is a maximum of eight characters long.

### PW

The pass word for the logging identifier. This is a maximum of eight characters long.

### FNAME

The name of the destination file.

### LW

The lock word on the destination file if the file is on disc.

### FGROUP

The group that the file resides in.

### FACCT

The account that the destination file resides in.

### UNAME

The name of the user who created the logging identifier.

### UACCT

The account of the user who created the logging identifier.

.....

**ENTRY SIZE = 33**

|    |                       |  |
|----|-----------------------|--|
| 0. | NUMBER OF ENTRIES     |  |
| 1. | MAX NUMBER OF ENTRIES |  |
| 2. |                       |  |

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

## DOUBLE ENTRIES

```

NENTRIES = DLIDTAB(0)
MENTRIES = DLIDTAB(1)

```

## NENTRIES

**The number of entries in the table.**

## MENTRIES

**The maximum number of entries in the table.**

\_\_\_\_\_

USER AREA = 117 WORDS

|   |     |     |   |   |   |    |    |    |
|---|-----|-----|---|---|---|----|----|----|
| 0 | 2   | 3   | 4 | 6 | 7 | 11 | 12 | 24 |
|   | 127 | 128 |   |   |   |    |    |    |

[illegible]

|   |     |   |   |   |   |   |
|---|-----|---|---|---|---|---|
| 0 | 2   | 3 | 4 | 6 | 7 | 8 |
|   | 127 |   |   |   |   |   |

```

|_____|_|_|_|_|_|_|_|
|rec#|cksum|code |time|DATE|log#|len| user area
|_____|_____|_____|_____|_____|_____|_____|_____

```

.....

|   |     |     |   |   |   |    |    |    |
|---|-----|-----|---|---|---|----|----|----|
| 0 | 2   | 3   | 4 | 6 | 7 | 11 | 12 | 24 |
|   | 127 | 128 |   |   |   |    |    |    |

[illegible]

|   |     |     |   |   |
|---|-----|-----|---|---|
| 0 | 2   | 3   | 4 | 6 |
|   | 127 | 128 |   |   |

| rec# | cksum | code | time | date |
|------|-------|------|------|------|
|      |       |      |      |      |

# LOG RECORD FORMAT (CONT)

-----

## HEADER RECORD START/RESTART

|     |     |   |   |   |   |    |
|-----|-----|---|---|---|---|----|
| 0   | 2   | 3 | 4 | 6 | 7 | 11 |
| 127 | 128 |   |   |   |   |    |

---

|      |       |      |      |      |       |
|------|-------|------|------|------|-------|
| rec# | cksum | code | time | date | logid |
|      |       |      |      |      |       |

---

## TRAILER RECORD

|     |     |   |   |   |   |    |
|-----|-----|---|---|---|---|----|
| 0   | 2   | 3 | 4 | 6 | 7 | 11 |
| 127 | 128 |   |   |   |   |    |

---

|      |       |      |      |      |       |
|------|-------|------|------|------|-------|
| rec# | cksum | code | time | date | logid |
|      |       |      |      |      |       |

---

## NULL RECORD

|     |     |   |   |   |
|-----|-----|---|---|---|
| 0   | 2   | 3 | 4 | 6 |
| 127 | 128 |   |   |   |

---

|      |       |      |      |      |
|------|-------|------|------|------|
| rec# | cksum | code | time | date |
|      |       |      |      |      |

---

## CODE DEFINITION

|        |                                          |
|--------|------------------------------------------|
| CODE=1 | OPEN LOG                                 |
| 2      | USER/SUBSYSTEM RECORD                    |
| 3      | CLOSE LOG                                |
| 4      | HEADER                                   |
| 5      | TRAILER                                  |
| 6      | RESTART                                  |
| 7      | CONTINUATION OF USER OR SUBSYSTEM RECORD |
| 9      | CRASH MARKER                             |
| SPACE  | NULL RECORD                              |

**NOTE:**

1. The checksum algorithm uses the exclusive or function against a base of negative one.
2. Null record is used for filler.
3. The code word of the logging record can contain a subsystem code defined by the user in the first half of the word (0:8). User logging allows privileged users to pass this code in the index parameter of the Open Log intrinsic.

|                                      |    |                               |                      |
|--------------------------------------|----|-------------------------------|----------------------|
| Reserved<br>for MEASIO<br>control    | 0  | LDEV # OF MEASIO              | MEASLDEV             |
|                                      | 1  | MEASIO PLABEL                 | MEASPLAB             |
|                                      | 2  | MEASIO DST #                  | MEASDSTN             |
|                                      | 3  |                               |                      |
|                                      | 4  |                               |                      |
|                                      | 5  |                               |                      |
|                                      | 6  |                               |                      |
| performance<br>tunning<br>parameters | 7  |                               |                      |
|                                      | 10 | STOP' FLAG                    |                      |
|                                      | 11 | ABSOLUTE MEMORY ADDRESS       |                      |
|                                      | 12 | INCREMENT VALUE               |                      |
|                                      | 13 | INCREMENT COUNT               |                      |
|                                      | 14 |                               |                      |
|                                      | 15 |                               |                      |
|                                      | 16 |                               |                      |
|                                      | 17 |                               |                      |
|                                      | 20 | GLOBAL STATISTICS XDS NUMBER  | MEASSTATX-<br>DSNUM  |
|                                      | 21 | PROCESS STATISTICS XDS BANK   | MEASPROC-<br>XDSBANK |
|                                      | 22 | PROCESS STATISTICS XDS BASE   | MEASPROC-<br>XDSBASE |
|                                      | 23 | PROCESS STATISTICS XDS NUMBER | MEASPROC-<br>XDSNUM  |
|                                      | 24 | CLASS 14 STATISTICS XDS BANK  |                      |
|                                      | 25 | CLASS 14 STATISTICS XDS BASE  |                      |

|    |                              |
|----|------------------------------|
| 26 | CLASS 14 STATISTICS XDS NUM. |
| 27 | CLASS 13 STATISTICS XDS BANK |
| 30 | CLASS 13 STATISTICS XDS BASE |
| 31 | CLASS 13 STATISTICS XDS NUM. |
| 32 | CLASS 12 STATISTICS XDS BANK |
| 33 | CLASS 12 STATISTICS XDS BASE |
| 34 | CLASS 12 STATISTICS XDS NUM. |
| 35 | CLASS 11 STATISTICS XDS BANK |
| 36 | CLASS 11 STATISTICS XDS BASE |
| 37 | CLASS 11 STATISTICS XDS NUM. |
| 40 | CLASS 10 STATISTICS XDS BANK |
| 41 | CLASS 10 STATISTICS XDS BASE |
| 42 | CLASS 10 STATISTICS XDS NUM. |
| 43 | CLASS 09 STATISTICS XDS BANK |
| 44 | CLASS 09 STATISTICS XDS BASE |
| 45 | CLASS 09 STATISTICS XDS NUM. |



|                                                         |    |                          |                          |
|---------------------------------------------------------|----|--------------------------|--------------------------|
| reserved<br>for<br>measurement<br>interface             | .  |                          |                          |
|                                                         | 50 | CLASS 0 ENABLED<br>COUNT | CLASS 1 ENABLED<br>COUNT |
|                                                         | 51 | CLASS 2 EN.CNT.          | CLASS 3 EN.CNT.          |
|                                                         | 52 | CLASS 4 EN.CNT.          | CLASS 5 EN.CNT.          |
|                                                         | 53 | CLASS 6 EN.CNT.          | CLASS 7 EN.CNT.          |
|                                                         | 54 | CLASS 8 EN.CNT.          | CLASS 9 EN.CNT.          |
|                                                         | 55 | CLASS 10 EN.CNT.         | CLASS 11 EN.CNT.         |
|                                                         | 56 | CLASS 12 EN.CNT.         | CLASS 13 EN.CNT.         |
|                                                         | 57 | CLASS 14 EN.CNT.         | CLASS 15 EN.CNT.         |
|                                                         | 60 |                          |                          |
| reserved<br>for<br>shared<br>clock<br>interface<br>user | 61 |                          |                          |
|                                                         | 62 |                          |                          |
|                                                         | 63 |                          |                          |
|                                                         | 64 |                          |                          |
|                                                         | 65 |                          |                          |
|                                                         | 66 |                          |                          |
|                                                         | 67 |                          |                          |

MEASINFOTAB (CONT)

|           |     |   |                      |             |
|-----------|-----|---|----------------------|-------------|
|           | 70  | M | FLAG                 | A           |
| shared    | 71  |   | XDSI                 |             |
| clock     | 72  |   | XDS2                 |             |
| interface | 73  |   | DCOUNT               |             |
| cells     | 74  |   | DLIMIT               |             |
|           | 75  |   | TCOUNT               |             |
|           | 76  |   | TLIMIT               |             |
|           | 77  |   | DLABEL               |             |
|           | 100 |   | MONITOR BUFFER INDEX | SMONIDX     |
|           | 101 |   | MEAS BUFFER          | MEASBUFO    |
|           | 102 |   | MEAS BUFFER INDEX    | MEASIDX     |
| reserved  | 103 |   | MEAS ENABLED FLAGS   | MEASMSKO    |
| for       | 104 |   | MEAS ENABLED FLAGS   | MEASMSK1    |
| event     | 105 |   | MEAS BUFFER BANK     | MEASBUFBANK |
| logging   | 106 |   |                      |             |
|           | .   |   |                      |             |
|           | .   |   |                      |             |
|           | 116 |   |                      |             |
|           | 117 |   |                      |             |

M: Interrupt has missed due to last interrupt handling.

A: Current interrupt handling active.

# CI Stack Definition

|         |                                   |
|---------|-----------------------------------|
| DB+%0   | BCOMIMAGE (Byte Ptr. To Command)  |
| DB+%1   | COMMAND IMAGE<br>(270 bytes)      |
| DB+%210 | LINELENSTACK<br>(30 words)        |
| DB+%246 | NEXTMSG (Not currently used)      |
| DB+%247 | THIS IS SPARE                     |
| DB+%250 | UDC0                              |
| DB+%251 | UDC1                              |
| DB+%252 | UDC2                              |
| DB+%253 | UDC3                              |
| DB+%254 | UDC4                              |
| DB+%255 | IFNESTING                         |
| DB+%256 | IFSKIP                            |
| DB+%257 | ELSESEEN                          |
| DB+%260 | CIFLAGS                           |
| DB+%261 | CONTINUE STATE STACK<br>(2 words) |
| DB+%263 | PENDINGCOMLEN                     |
| DB+%264 | BLASTCOMIMAGE (Byte Ptr.)         |
| DB+%265 | LAST COMMAND IMAGE<br>(270 bytes) |

## Field Definitions

BCOMIMAGE: Byte pointer to COMIMAGE (sometimes called WCOMIMAGE) in the CI stack.

COMMAND IMAGE: Command character string currently being executed.

LINELENSTACK: A CI command can span up to 30 input lines. This stack holds the length of each input line.

NEXTMSG: Used to be used to link messages together. No longer being used.

THIS IS SPARE: Not used.

UDC0: Holds the DST number of the UDC definitions.

UDC1: Holds the old S register value for UDC's.

UDC2: (0:1)--FLUSHUDC, used by :SETCATALOG

UDC3: UDC options for current UDC.

UDC4: (0:1)--UDC Fatal Ci Error  
(1:1)--UDC EXITBREAK  
(2:1)--UDC BREAKDETECTED  
(3:1)--UDC NOPRINT  
(4:1)--UDC IMAGEADJUST  
(10:6)--UDC NESTLEVEL

IFNESTING: Level of nesting of :IF commands.

IFSKIP: Whether the current commands are being skipped as the false part of a :IF command.

ELSESEEN: Level of the :ELSE commands.

CIFLAGS: (13:1)--Sequenced: line numbers at rear.  
(15:1)--Not REDOable (last command).

CONTINUE STATE STACK: History of the :CONTINUE commands.  
= 0--no :CONTINUE  
= 1--just seen  
= 2--in effect.

PENDINGCOMLEN: If <> 0, command is already in stack and this word is the command string length.

BLASTCOMIMAGE: Byte pointer to last command image.

LAST COMMAND IMAGE: Before a command begins execution, the command string is copied here for use by the :REDO command.

# Association DST Layout

|                                      |                     |     |                |
|--------------------------------------|---------------------|-----|----------------|
| =====                                |                     | 0   |                |
| Not                                  |                     | 1   |                |
|                                      |                     | 2   |                |
| Used                                 |                     | 3   |                |
|                                      |                     | 4   |                |
|                                      |                     | 5   |                |
|                                      |                     | 6   |                |
| =====                                |                     |     |                |
| Not Used                             | JMAT Index (8 bits) | 7   | \              |
| =====                                |                     |     |                |
| Not Used                             | JIT Index (10 bits) | 8   |                |
| =====                                |                     |     |                |
| DST rel. index to user's next entry. |                     | 9   | - Ldev 1       |
|                                      |                     |     | (Associated)   |
| Class name under which this ldev is  |                     | 10  |                |
| associated. Left justified and       |                     | 11  |                |
| padded with blanks. 8 bytes.         |                     | 12  |                |
|                                      |                     | 13  | /              |
| =====                                |                     |     |                |
| 0                                    |                     | 14  | \              |
|                                      |                     |     |                |
| 0                                    |                     | 15  |                |
|                                      |                     |     |                |
| 0                                    |                     | 16  | - Ldev 2       |
|                                      |                     |     | (Unassociated) |
|                                      |                     | 17  |                |
| Don't                                |                     | 18  |                |
| Care                                 |                     | 19  |                |
|                                      |                     | 20  | /              |
| =====                                |                     |     |                |
|                                      |                     |     |                |
| .                                    | .                   | .   |                |
| .                                    | .                   | .   |                |
| .                                    | .                   | .   |                |
| =====                                |                     |     |                |
| JMAT Index or 0                      |                     | 7*n | \              |
| =====                                |                     |     |                |
| JIT Index or 0                       |                     |     |                |
| =====                                |                     |     |                |
| Next Entry Pointer or 0              |                     |     | - Ldev n       |
| =====                                |                     |     |                |
| Classname                            |                     |     |                |
| or Don't Care                        |                     |     |                |
|                                      |                     |     | /              |
| =====                                |                     |     |                |

There is one entry in the Association DST for every logical device in the system.

Association DST number: 34 (%42)  
Association SIR number: 24 (%30)

## Message File Mechanics

=====

## Message File Data Structures

-----

This chapter contains the data structures necessary to support message files. The first section details the message file's version of the familiar file system data structure; ie, the file label, file control block, access control block, etc..

The second section show the tables used by the basic ipc mechanism which is a set of internal, MPE procedures designed to support the "boundary conditions" of ipc files. For example, signalling a no wait reader that its record has arrived. See the section's introduction for a detailed description.

### File Structure

#### File label/FCB extent map

|                           | End of file block | Start of file block |
|---------------------------|-------------------|---------------------|
| .....                     |                   |                     |
| : Disc addr of extent 0   | :                 | .                   |
| .....                     | :                 | .                   |
| : Disc addr of extent 1   | :                 | v                   |
| .....                     | :                 | .                   |
| : Disc addr of extent 2   | :                 | -                   |
| .....                     | :                 | .                   |
| : Disc addr of extent 3   | :                 | .                   |
| .....                     | :                 | .                   |
| z                         | z                 | .                   |
| .....                     | :                 | .                   |
| : Disc addr of extent n-1 | :                 | v                   |
| .....                     | :                 | -                   |
| : Disc addr of extent n   | :                 |                     |
| .....                     | :                 |                     |

The EOF and SOF are examples only, meant to show that 1) the start of file moves into the extent map as records are read and 2) that the file can wrap around and, hence, cause the SOF to be greater than the EOF.

When a file becomes empty the SOF and EOF are reset to the first block of extent zero.

Each extent is composed of a number of blocks. Extents all have the same number of blocks. Extent zero also contains space for the file label and user labels in the exact same format as standard files.

Starting with block zero, sufficient blocks are allocated to the file label/user labels to satisfy their space requirements.

Extents outside of the SOF/EOF range may not exist. They are deleted at close time when there are no more writers accessing the file.



## Block Structure

```
..... *****
: First data record :
:.....: Exact same format as standard
: Second data record : variable length blocks.
:.....:
z z
:.....:
: Last data record :
:.....:
: Record delimiter (-1) :
:.....: *****
:
: Empty space (next record :
: would not fit) :
:
:.....:
: Header delimiter (%77) :
:.....:
: Last header record :
:.....:
z z
:.....:
: Second header record :
:.....:
: First header record :
:.....:
```

Separating the data portion of the records from their header enables the standard file system access procedures to read the records with no knowledge that they are msg file records.

### Record Format

```
.....
: Number of bytes in record :
:.....:
: First data word of record :
:.....:
z z
:.....:
: Last data word of record :
:.....:
```

Length word's value does not include itself.

### Header Format

```
.....
: C:LC: : Header Type: 0
:.....:
: Writer's ID : -1
:.....:
```

C (0:1) - Set on if this was the last record written before the system crashed. This bit is set on by the first open on the file after the crash.

LC (1:1)- Valid only for close headers. Set to one if this is the last writer to close the file.

Type(8:8)- 0 data  
          1 open  
          2 close

## Message Access Control Block

### Notes:

1. Words/fields that do not pertain to message files are left blank.
2. This diagram shows the "combined" ACB as it appears to the message access procedures (the procedures in IPC). Thus it is a combination of the LACB and the PACB.

```
.....
0 : : Size of the ACB including buffers (words) : 0
.....
1 : : File number : 1 *
.....
2 : File name : 2 *
.....
z z *
.....
6 : Foptions : 6 *
.....
7 : Aoptions : 7 *
.....
8 : Record size (bytes) : 10 *
.....
9 : Block size (words) : 11 *
.....
z z *
.....
11 : Carriage control code (writers) : 13 *
.....
z z *
.....
14 : Error code : 16 *
.....
15 : Transmission log (units same as last read/write) : 17 *
.....
16 : Total number of unread records (includes opens : 20
.....
17 : and closes) : 21
.....
18 : Block number of the file's tail (relative to the : 22
.....
19 : start of file block) : 23
.....
20 : Logical record transfer count : 24
.....
21 : : 25
.....
```

|    |                                                   |      |
|----|---------------------------------------------------|------|
| 22 | : Physical block transfer count                   | : 26 |
| 23 | :                                                 | : 27 |
| 24 | : Address of the head record's header             | : 30 |
| 25 | : Address of the next write header                | : 31 |
| 26 | : FCB control block vector                        | : 32 |
| z  |                                                   | z    |
| 28 | : Number readers : Number readers & writers       | : 34 |
| 29 | z                                                 | z    |
| 30 | : : Records per block                             | : 36 |
| 31 | :Wrt buf indx: : # buf - 1                        | : 37 |
| 32 | : Address of the head record's data               | : 40 |
| 33 | : Size of the buffer (words)                      | : 41 |
| z  |                                                   | z    |
| 38 | : : Logical device number                         | : 46 |
| 39 | :0:# rd buf : # wt buf :er :qw :m :c :d :s :f     | : 47 |
| 40 | : Number of max sized free records                | : 50 |
| 41 | :                                                 | : 51 |
| 42 | : Number of free words in the current free record | : 52 |
| 43 | : Address of the next write record                | : 53 |
| 44 | : Number of nondata records in the file           | : 54 |
| 45 | :                                                 | : 55 |
| 46 | : # of read requests that have a claim on file    | : 56 |
| 47 | : Last read error : Last write error              | : 57 |
| 48 | : DST number of the physical ACB                  | : 60 |
| 49 | : Address of the physical ACB                     | : 61 |

|    |                                                     |        |
|----|-----------------------------------------------------|--------|
| 50 | : DST number of the logical ACB                     | : 62   |
| 51 | : Address of the logical ACB                        | : 63   |
| 52 | : DST rel address of the stack access control blk   | : 64   |
| 53 | : DST rel address of the DB area                    | : 65   |
| 54 | : PACB vector table entry address                   | : 66   |
| 55 | : PACB control block vector table address           | : 67   |
| 56 | : Target area's DST number                          | : 70   |
| 57 | : Reserved for calling parameters                   | : 71   |
| 58 | :                                                   | : 72   |
| 59 | :                                                   | : 73   |
| 60 | : Reserved for the stack marker from file system    | : 74   |
| 61 | : intrinsics                                        | : 75   |
| z  |                                                     | z      |
| 64 | : Number of seconds to wait on boundary condition   | : 100* |
| 65 | : 0:Ex:Nd:Vr:Bt:Cls :C : Carriage control           | : 101* |
| 66 | : Reply Port (basic IPC port)                       | : 102* |
| 67 | : Writer ID                                         | : 103* |
| 68 | : Control block index for nowait writer record buf  | : 104* |
| 69 | : DST relative addr of nowait writer record buffer  | : 105* |
| 70 | : No wait I/O resultant error code                  | : 106* |
| 71 | : No wait I/O resultant transmission log            | : 107* |
| 72 | : Write wait queue (basic IPC port)                 | : 110  |
| 73 | : Read wait queue (basic IPC port)                  | : 111  |
| 74 | : Head record's length (bytes)                      | : 112  |
| 75 | : Head record's record type (same values as header) | : 113  |

|    |                                                    |       |
|----|----------------------------------------------------|-------|
| 76 | : Head record's writer ID                          | : 114 |
| 77 | : Head record's header word value                  | : 115 |
| 78 | : Max size record plus its overhead (words)        | : 116 |
| 79 | : ACB wait queue message - contains same info as   | : 117 |
| 80 | : the wait queue message in the Message Queue      | : 120 |
| 81 | : Entry                                            | : 121 |
| 82 | :                                                  | : 122 |
| 84 | : Waiter's reply port, 0 if using ACB compltn area | : 124 |
| 85 | : ACB completion message area - see Message Queue  | : 125 |
| 86 | : Entry for completion message format              | : 126 |
| 87 | : Waiting process's PCB address (rel to PCB base)  | : 127 |
| 88 | : DST rel address of buffer one                    | : 130 |
| 89 | : DST rel address of buffer two                    | : 131 |
| 90 | : Etc.                                             | : 132 |

\* Value is private to a particular accessor.

| Word | Field | Description |
|------|-------|-------------|
|------|-------|-------------|

|       |         |                                                                                                                         |
|-------|---------|-------------------------------------------------------------------------------------------------------------------------|
| 65    |         | Accessor's local flags.                                                                                                 |
| (0:1) | O 1     | - have not yet issued an FREAD/FWRITE against the file.                                                                 |
| (1:1) | ex 1    | - extended wait mode.                                                                                                   |
| (2:1) | nd 1    | - do not destroy the next record read.                                                                                  |
| (3:1) | vr 1    | - writer has not yet written his first record (ie., he is a virgin).                                                    |
| (4:1) | bt 0    | - transmission log should be expressed in words.                                                                        |
|       | 1       | - " " " " " " bytes.                                                                                                    |
| (5:1) | cls     | Not currently used (reserved for group IPC standard).                                                                   |
| (6:1) | C       | No wait completion message is in LACB area.                                                                             |
| (8:8) | car ctl | carriage control character to be used for the writer's record (a value of one indicates no carriage control character). |

| Word | Field  | Description                                                      |
|------|--------|------------------------------------------------------------------|
| 39   |        | File's global flags.                                             |
|      | (9:1)  | er 1 - extended read                                             |
|      | (10:1) | qw 1 - one or more writers has been queued on the<br>wait queue. |
|      | (11:1) | m 1 - wait msg is located in the ACB                             |
|      | (12:1) | c 1 - completion msg is located in the ACB                       |
|      | (13:1) | d 1 - the current write buffer has dirty bit set                 |
|      | (14:1) | s 1 - the start of file is block zero                            |
|      | (15:1) | f 0 - the ACB buffers have not been filled                       |

### MMSTAT Definitions

| Octal Value | Event Type  | Parameter 1           | Parameter 2                                 |
|-------------|-------------|-----------------------|---------------------------------------------|
| 72/0        | Read init   | # free rec            |                                             |
| 72/1        | Read compl  | (0:8) error, (8:8) ID | Number of records                           |
| 72/2        | Write init  | (0:8) # rec, (8:8) ID | Number of free records                      |
| 72/3        | Write compl | (0:8) error, (8:8) ID | Number of free records                      |
| 72/4        | Control     | (0:8) error, (8:8) ID | (0:4) func, (4:12) parm                     |
| 72/5        | EOF         | (0:8) error, (8:8) ID | Number of records                           |
| 72/6        | Open        | (0:8) error, (8:8) ID | Number of records                           |
| 72/7        | Close       | (8:8) #free, (8:8) ID | Number of records                           |
| 72/10       | Initiation  | 0                     | (0:8) fix, (8:8) update                     |
| 73/0        | Put record  | (0:8) error, (8:8) ID | (0:3) rec type,<br>(3:13) number of records |
| 73/1        | Delete rec  | (0:8) error, (8:8) ID | (0:3) rec type<br>(3:13) number of records  |
| 73/2        | Delete blk  | Start of file block # | End of file block #                         |

#### Notes:

1. The aa/bb notation in the "octal value" column denotes type/subtype. Type is the actual MMSTAT event number. Subtype is (0:4) of parameter 0.
2. Several items can possibly exceed their fields, in that case the bits beyond the field are lost. These items are number of records, number of free records, start of file, and end of file.



3. Parameter word zero has a common format for all the MMSTAT events.

| Field  | Description                                                                                                                                                                               |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (0:4)  | Event's subtype.                                                                                                                                                                          |
| (4:2)  | File's state<br>0 - empty<br>1 - partially full<br>2 - only a fraction of a free record is left<br>3 - completely full                                                                    |
| (6:1)  | Nonzero indicates that there is one or more waiting readers.                                                                                                                              |
| (7:1)  | Nonzero indicates that there is one or more waiting writers.                                                                                                                              |
| (11:1) | Nonzero indicates that the write has a carriage control character.                                                                                                                        |
| (12:4) | Flags local to the accessor.<br>(12:1) - the accessor has done no FREADs/FWRITEs<br>(13:1) - extended wait<br>(14:1) - nondestructive read<br>(15:1) - writer has not written any records |

## File System Basic IPC Definitions

The objective of this set of uncallable procedures is to provide a simple ipc mechanism to support the ipc file access procedures. It enables one process to send short, control messages to another process.

### General behavior

#### FCPORTOPEN procedure

The heart of this mechanism is the port. A process desiring to receive messages would first open (create) a port. This process is termed the "port manager." When the port is created, a port number is returned to the opener. Since the port number value cannot be known in advance, potential senders need some method of obtaining the port number from the port manager.

Both the ports and the messages are contained in a single disc resident data segment. There can be a total of over thirty-five hundred open ports and outstanding messages. Thus neither ports nor message blocks are scarce resources.

#### FCPORTSEND procedure

This procedure sends a 0 to 5 word message to a port. Optionally a timeout value may be specified which will limit the duration the message will remain attached to the port. Expiration of the timeout causes the message to be deleted from the target port's queue and placed on the sender's reply port (specified by the sender in the FCPORTSEND procedure call).

#### FCPORTRECEIVE

Reads and deletes the head message from a port. The sender's return port number is also given to the receiver, enabling him to send a reply message.

#### FCPORTCLOSE

Demolishes the port.

### IPC file's use of this mechanism

All open message files have two ports open for the file (read wait queue and write wait queue), plus one port per accessor (reply port). Their use is described in the following.

### Reader and writer wait queues

When an empty message file is accessed by more than one reader (share), then there must be a way of having the readers' FREADs satisfied in the same order that they were issued. That is, there must be queue of waiting readers. The ipc access procedures accomplish this by dedicating a basic ipc port as a "read wait queue." Whenever a reader's request is stalled because the file is empty, a message is sent to the read wait queue. Subsequent FREADs by other processes will queue up behind the first reader in a FIFO manner. An FWRITE will take the first entry from the wait queue and send a "read may be done" message to the reader's reply port.

In a like manner multiple writers will queue on the write wait queue when the file is full.

### Completion notification for nowait I/O

The IOWAIT intrinsic waits for a message to be sent to the reply port (s) of the specified user files.

### Timeouts

When an accessor encounters a boundary condition (ex, a reader accesses an empty file), it may specify that the condition must be satisfied in x seconds (FCONTROL 4). To this end the ipc access procedures merely issue the FCPORTSEND to the wait queue with the user's timeout value specified. The timeout will tear the message from the wait queue and place it on the accessor's reply port.

## Port Data Structures

### Port data segment

```

System DB extension :Port DST #:
+ %100 :
 :
 :
 :
 :
 :
 :
 :
Port data segment : Global area :
 :
 :
 z z
 :
 :
 :
 : Remainder is :
 : composed of :
 : "block size" :
 : chunks. :
 :

```

The chunks are a combination of free entries, ports, message queue entries, and timer list entries.

### Port with two outstanding messages

```

.....
: Port :----->: MQE 1 :----->: MQE 2 :
: : : : : :
: : : : : :
.....

```

Port number

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
.....  
:Port index : Port data segment relative addr/8 :  
.....

Port index    Index into the port DST number array

Port DST Number Array

Located in System DB Extension Area.

.....  
64 : Port data segment number : 64  
.....  
65 : Reserved for a second port segment : 65  
.....

# Port Data Segment Global Area

|    |                                                 |      |
|----|-------------------------------------------------|------|
| 0  | : Data segment number of this port data segment | : 0  |
| 1  | : Block size in words                           | : 1  |
| 2  | : Total number of blocks                        | : 2  |
| 3  | : Maximum number of blocks                      | : 3  |
| 4  | : Current number of free blocks                 | : 4  |
| 5  | : Number of open ports                          | : 5  |
| 6  | : Head of free list                             | : 6  |
| 7  | : Tail of free list                             | : 7  |
| 10 | : Head of impeded process list                  | : 8  |
| 11 | : Tail of impeded process list                  | : 9  |
| 12 | : Head of timeout thread (TQE address)          | : 10 |
| 13 | : TRLX of timeout                               | : 11 |
| 14 | : Value returned by TIMER intrinsic when        | : 12 |
| 15 | : Timeout was initiated.                        | : 13 |
| 16 | : Head of port address list.                    | : 14 |
| 17 | : Not used.                                     | : 15 |

# Port

|     | 0                                  | 1  | 2  | 3  | 4                 | 5  | 6  | 7  | 8                | 9  | 10  | 11  | 12  | 13  | 14  | 15   |   |
|-----|------------------------------------|----|----|----|-------------------|----|----|----|------------------|----|-----|-----|-----|-----|-----|------|---|
| 0 : | Head MQE address                   |    |    |    |                   |    |    |    |                  |    |     |     |     |     |     | :    | 0 |
| 1 : | Tail MQE address                   |    |    |    |                   |    |    |    |                  |    |     |     |     |     |     | :    | 1 |
| 2 : | E                                  | :  | W  | :  | Port list thread. |    |    |    |                  |    |     |     |     |     | :   | 2    |   |
| 3 : | Reserved                           |    |    |    |                   |    |    | :  | Port manager pin |    |     |     |     |     |     | :    | 3 |
| 4 : | Reserved                           |    |    |    |                   |    |    |    |                  |    |     |     |     |     |     | :    | 4 |
| 5 : | Number of MQEs in the port's queue |    |    |    |                   |    |    |    |                  |    |     |     |     |     |     | :    | 5 |
| 6 : | Number of sends to this port       |    |    |    |                   |    |    |    |                  |    |     |     |     |     |     | :    | 6 |
| 7 : | Reserved                           |    |    |    |                   |    |    |    |                  |    |     |     |     |     |     | :    | 7 |
|     | :0                                 | :1 | :2 | :3 | :4                | :5 | :6 | :7 | :8               | :9 | :10 | :11 | :12 | :13 | :14 | :15: |   |

E      Enable wake up bit  
          0 - Do not awaken the process  
          1 - Awaken the process

W type Action to be taken on an enabled port when a message is received.

0 - Awaken the process on a message wait bit.

1/3 Reserved for future use.

### Message Queue Entry (MQE)

```

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
.....
0 : Next MQE entry; if last, (port addr) LOR 7 : 0
.....
1 : Return port : 1
.....
2 : Time List Entry (TLE), 0=no timeout, -1=timed out: 2
.....
3 : Parameter zero : 3
.....
4 : Parameter one : 4
.....
5 : Parameter two : 5
.....
6 : Parameter three : 6
.....
7 : Parameter four : 7
.....
:0 :1 :2 :3 :4 :5 :6 :7 :8 :9 :10:11:12:13:14:15:
```

Timer entry definitions - 0 - no timeout  
1 - timeout expired  
2 - TLE address for a pending timeout

### File System Message Files

-----

#### Wait Message

parm#

- 0 - WRITER ID
- 1 - LOCAL FLAGS (differ with each accessor)
  - (0:1) - accessor just opened file
  - (1:1) - will wait on boundary condition if no symbiotic process
  - (3:1) - writer has not written a record
  - (4:1) - transmission log in bytes
  - (8:1) - carriage control code
- 2 - DST# of data buffer
- 3 - Address of data buffer (DST relative)
- 4 - Length of data buffer in bytes

#### Completion Message

- 0 - Resultant error code
- 1 - Resultant transmission log in bytes



Timer List Entry (TLE)

```
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
.....
0 : Next TLE (sorted in incr time val), 0 if last: 0
.....
1 : Preceding TLE entry (0 if first entry) : 1
.....
2 : Number of milliseconds the timeout value : 2
.....
3 : of this TLE is beyond the previous TLE. : 3
.....
4 : Address of the affected MQE : 4
.....
5 : Address of the MQE's port : 5
.....
6 : Set to %000125 if active, %000252 when done : 5
.....
7 : Value of TIMER when timeout expires (secs) : 7
.....
:0 :1 :2 :3 :4 :5 :6 :7 :8 :9 :10:11:12:13:14:15:
```

# MMSTAT Definitions

| Octal Value | Event Type         | Parameter 0  | Parameter 1               | Parameter 2       |
|-------------|--------------------|--------------|---------------------------|-------------------|
| -----       | -----              | -----        | -----                     | -----             |
| 62          | Open               | Port number  | Port DST num              | Flags parameter   |
| 63          | Receive completion | Port number  | MQE address 15:1 Waitspc  | Return port       |
| 64          | Send               | Port number  | MQE address 15:1 Q type   | Return port       |
| 65          | Change status      | Port number  | 0 = enable<br>1 = disable | Head MQE address  |
| 66          | Abort              | Port number  | Parameter zero            | Return port       |
| 67          | Close              | Port number  | Port DST                  | # open ports left |
| 70          | Expand             | Port DST num | # expand blks             | Total # blocks    |
| 71          | Timeout expired    | Port num     | MQE address               | Return port       |

## I. Overview of Facility

The memory resident message facility of MPE IV addresses the need for an efficient, simple, and uniform method for system code to send short status-type messages to processes.

Each process is created with a message harbor which supports a set of message ports which are private to that process. There is a maximum of four ports per harbor in the initial implementation. This limit can be easily extended when new ports are required.

Any system code, even code running on the ICS, can send a message to any port of any process. The destination process' PIN must be known, and a priori conventions on portnumber and message formats must be established. The caller of SENDMSG may optionally specify that the destination process be awakened from a message wait.

The caller of SENDMSG specifies whether the message is to be buffered in the primary message table or the secondary message table. When the secondary table is specified, if the pool of secondary message entries is exhausted, the calling process is queued for a message table entry and blocked until one becomes available. Use of the primary message table is reserved for code running on the ICS or during critical sections (Pdisabled or Disabled intervals) in which it is not possible to release control of the processor to queue for a free message table entry. If the primary table is specified and no free entries are available, the SENDMSG crashes the system.

Messages can be of any length up to the configured maximum. Message length is specified in the call to SENDMSG and RECEIVMSG. In the initial implementation, messages are limited to 4 words in length. This maximum can be easily increased if the need arises.

By calling PORTSTATUS, a process may at any time determine whether a specified port is non-empty or obtain the portnumber of his most urgent non-empty port (lowest numerical port number =most urgent port).

By calling RECEIVMSG, a process may receive the message at the head of his specified message port. This receive is optionally non-destructive.

A process can wait on a message wait, or on a combination of message wait and other wait types.

## II. Message Intrinsic

- ```
A.  Procedure SENDMSG(Destpin, Destport, Msglength, Flags);
    Value Destpin, Destport, Msglength, Flags;
    Integer Destpin, Destport, Msglength;
    Option Privileged, Uncallable;
    Logical Flags;
```

Destpin, Destport, and Msglength had better be within range and reasonable (process and port exist), since SENDMSG checks and will crash if the parameters are bad.

The caller of SENDMSG stacks the message contents before calling the procedure. SENDMSG expects the first msg word to be at Q-7-Msglength, and the last msg word at Q-8. The message contents at Q-8 to Q-7-Msglength are deleted from top of stack by the exit from SENDMSG to the caller.

```

Flags.(1:1)=1 ==> Wake-up destination process from a
                    message wait
                    .(0:1)=1 ==> place message in secondary message
                    table
Return CC=CCG if process was already awake else CC=CCE.

```

- ```
B. Logical Procedure PORTSTATUS(Portnumber);
 Value Portnumber;
 Integer Portnumber;
 Option Privileged,Uncallable;
```

When supplied a valid port number, `PORTSTATUS` returns a true value if the port is non-empty and a false value if the port is empty.

When passed a -1 as portnumber parameter, PORTSTATUS returns the portnumber of the process' most urgent non-empty port (the smaller the number, the more urgent the port).

If all ports are empty, PORTSTATUS returns CC=CCE. If at least one port is non-empty, PORTSTATUS returns CC=CCG.

C. Procedure RECEIVMSG(Portnum,Msglength,Flags);  
Value Portnum,Msglength,Flags;  
Integer Portnum,Msglength;  
Option Privileged,Uncallable;  
Logical Flags;

Portnum and Msglength had better be within range or else  
its Suddenddeath time.

The caller of RECEIVMSG does an ADD S Msglength to make  
space for the message contents. RECEIVMSG stores the  
message contents into Q-8,Q-9,...,Q-7-Msglength.  
Q-7-Msglength contains the first word of the message.

Flags.(0:1)=1 ==> do not release message from head of  
port's message queue (non-destructive  
read)

Return CC=CCG if port was empty, else CC:=CCE.

### III. Supporting Data Structures

#### A. Message Harbor Table [DST #57 (%71)]

-----

The message facility is presently used only by the Dispatcher and should not be used by any process. The Message Harbor Table is created during system generation. It is a resident structure, though needn't reside in bank 0. Its base is located through the DST entry which describes it.

|                              |                |
|------------------------------|----------------|
| *.....*                      |                |
| * LINK TO FIRST MSG PORT 0 * | MESSAGE HARBOR |
| *-----*                      |                |
| * LINK TO FIRST MSG PORT 1 * | TABLE ENTRY    |
| *-----*                      |                |
| * LINK TO FIRST MSG PORT 2 * | FORMAT         |
| *-----*                      |                |
| * LINK TO FIRST MSG PORT 3 * |                |
| *-----*                      |                |
| * NON-EMPTY PORT MASK *      |                |
| *.....*                      |                |

FIRST MSG QUEUE LINK .(0:1) =1 ==> NEXT MESSAGE IN SECONDARY  
MESSAGE TABLE  
.(1:15) = INDEX OF NEXT ENTRY IN  
APPROPRIATE TABLE

# MESSAGE TABLES

Prim Msg Tab DST = #58 (%72)  
 Sec Msg Tab DST = #60 (%74)

There are two flavors of tables which are used to buffer sent messages, the primary and secondary message tables. The tables are identical in format, but independently configurable with respect to size. Both tables are resident structures, though they needn't be located in bank 0. The bases of the message tables are located by looking up their addresses in the DST entry describing them.

|                                  |                |
|----------------------------------|----------------|
| *****                            |                |
| * # OF CONFIGURED ENTRIES *      |                |
| *-----*                          |                |
| * # ENTRY SIZE (5) *             | MESSAGE TABLE  |
| *-----*                          |                |
| * # ENTRIES AVAILABLE *          | ENTRY ZERO     |
| *-----*                          |                |
| * INDEX OF FIRST FREE ENTRY *    | FORMAT         |
| *-----*                          |                |
| * PIN OF FIRST IMPEDED PROCESS * |                |
| *.....*                          |                |
| *.....*                          |                |
| * NEXT MSG IN QUEUE LINK *       | MESSAGE TABLE  |
| *-----*                          |                |
| * MSG WORD 1 *                   | ASSIGNED ENTRY |
| *-----*                          |                |
| * MSG WORD 2 *                   | FORMAT         |
| *-----*                          |                |
| * MSG WORD 3 *                   |                |
| *-----*                          |                |
| * MSG WORD 4 *                   |                |
| *.....*                          |                |
| *.....*                          |                |
| * %100000 *                      |                |
| *-----*                          |                |
| * INDEX NEXT FREE ENTRY *        | FREE ENTRY     |
| *-----*                          |                |
| * Don't Care *                   | FORMAT         |
| *-----*                          |                |
| * Don't Care *                   |                |
| *-----*                          |                |
| * Don't Care *                   |                |
| *.....*                          |                |

NEXT MSG IN QUEUE LINK .(0:1) =1 ==> NEXT MESSAGE IN SECONDARY  
MESSAGE TABLE  
.(1:15) = INDEX OF NEXT ENTRY IN  
APPROPRIATE TABLE



## Message Port Assignments

---

Message Port 0 : Junk Port (to be used when no message  
interference can occur.)  
Message Port 1 : Reserved (for message facility)  
Message Port 2 : Reserved (for message facility)  
Message Port 3 : Image Port

!  
!  
!

HP3000  
MMSTATS EVENT CATALOG

# MMSTAT CATALOG INDEX

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| 2                       | MEMORY MANAGER                   | 20-10                |
| 4                       | SCHEDULING                       | 20-13                |
| 6                       | FILESYS                          | 20-16                |
| 7                       | FILESYS                          | 20-25                |
| 8                       | FILESYS                          | 20-30                |
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## MMSTATS CATALOG INDEX

| EVENT NAME      | EVENT NO. |         | EVENT NAME         | EVENT NO. |         |
|-----------------|-----------|---------|--------------------|-----------|---------|
| -----           | DEC.      | %       | -----              | DEC.      | %       |
| ALCSTBLK        | 20        | 024 (-) | * FREAD            | 62        | 076 (-) |
| ALLOCMEM        | 12        | 014     | * FREADDIR         | 64        | 100 (-) |
| BINREAD         | 233       | 351 (-) | * FREADLABEL       | 76        | 114 (-) |
| BREAK           | 237       | 355 (-) | * FREADSEEK        | 68        | 104 (-) |
| CABORTIO        | 142       | 216     | * FRENAME          | 80        | 120 (-) |
| CCLOSE          | 146       | 222     | * FSETMODE         | 72        | 110 (-) |
| CCLOSETRACEFILE | 154       | 232     | * FSPACE           | 69        | 105 (-) |
| CCONTROL        | 152       | 230     | * FUNLOCK          | 79        | 117 (-) |
| CGARBAGE        | 7         | 007     | * FUPDATE          | 66        | 102 (-) |
| CONFIG-INFO     | 221       | 335 (-) | * FWRITE           | 63        | 077 (-) |
| CONFIG-INFO     | 222       | 336 (-) | * FWRITEDIR        | 65        | 101 (-) |
| CONFIG-INFO     | 223       | 337 (-) | * FWRITELABEL      | 77        | 115 (-) |
| COPEN           | 140       | 214     | * GIPINTERRUPT     | 192       | 300     |
| COPENRACEFILE   | 153       | 231     | * IOBUFTRAP        | 125       | 175     |
| CPOLLIST        | 155       | 233     | * I/O COMPLETION   | 111       | 157 (-) |
| CREAD           | 147       | 223     | * IOWAIT           | 67        | 103 (-) |
| CREAD1          | 147       | 240     | * MAKEOC           | 1         | 001     |
| CSDRIVER        | 150       | 226     | * MONINIT          | 228       | 344 (-) |
| CSIOWAIT        | 144       | 220     | * MONOFF           | 229       | 345 (-) |
| CWRITE          | 149       | 225     | * PROCESS COMPLETE | 211       | 323 (-) |
| DC1DC2ACK       | 231       | 347 (-) | * QONSEG           | 0         | 000     |
| DEALLOCM        | 13        | 015     | * QUIESCE          | 40        | 050     |
| DEALCSTBLK      | 21        | 025 (-) | * RELRESOURCES     | 23        | 027 (-) |
| DISKBUGCATCHER  | 200       | 310     | * SEGIOINIT        | 5         | 005     |
| DISKBUGCATCHER  | 201       | 311     | * SIODM            | 195       | 303     |
| DISKERROR       | 100       | 144 (-) | * SIODONE          | 6         | 006     |
| DISKERROR       | 101       | 145 (-) | * SPECCHAR         | 236       | 354 (-) |
| DISKINTRPT      | 191       | 277     | * SPECIALRQ        | 2         | 002     |
| DISKSPACE       | 120       | 170 (-) | * SPECREAD         | 238       | 356 (-) |
| DISKSPACE       | 121       | 171 (-) | * START I/O        | 110       | 156 (-) |
| DISK TRAFFIC    | 98        | 142 (-) | * SWAPIN           | 8         | 010     |
| FCHECK          | 74        | 112 (-) | * SYSPINS          | 224       | 340 (-) |
| FCLOSE          | 81        | 121 (-) | * SYSPINS          | 225       | 341 (-) |
| FCONTROL        | 71        | 107 (-) | * SYSPINS          | 226       | 342 (-) |
| FETCHSEG        | 4         | 004     | * SYSPINS          | 227       | 343 (-) |
| FGETINFO        | 75        | 113 (-) | * TERMLOGOFF       | 235       | 353 (-) |
| FLOCK           | 78        | 116 (-) | * TERMLOGON        | 234       | 352 (-) |
| FOPEN/(DA)      | 60        | 074 (-) | * TERMREAD         | 230       | 346 (-) |
| FOPEN/(DA)      | 61        | 075 (-) | * TERMWRITE        | 232       | 350 (-) |
| FPOINT          | 70        | 106 (-) | *                  |           |         |

```

*
*
* MMSTAT EVENT GROUP 0
*
* MEMORY MANAGEMENT EVENTS
*

```

# EVENT 0

EVENT NAME: OONSEG  
DESCRIPTION: ABSENCE TRAP ON CODE/DATA SEGMENT

CALLING MODULE: KERNELC  
CALLING PROCEDURE(S): QUEUEONSEGMENT

## PARAMETER DESCRIPTION

-----

P1 = SEGIDENTIFIER.(0:2) = SEG TYPE FIELD  
= 0 => SEG IS A DATA SEGMENT,  
.(2:14) = DST ENTRY NUMBER  
= 1 => SEG IS AN SL SEGMENT,  
.(2:14) = SL ENTRY NUMBER  
= 2,3 => SEG IS PART OF A PROGRAM,  
.(1:7) = PROGRAM INDEX  
INTO CSTBLK  
.(8:8) = LOGICAL SEGMENT  
NUMBER (0-255)  
P2 = PCB01(CPCB) - SLL POINTER  
P3 = STATUS (IN STACK MARKER) OF CALLING (TRAPPING) SEGMENT

EVENT 1

-----

EVENT NAME: MAKEOC

DESCRIPTION: MAKE SEGMENT AN OVERLAY CANDIDATE - RELEASE SEGMENT  
TO THE POOL OF AVAILABLE SPACE

CALLING MODULE: KERNELC

CALLING PROCEDURE: MAKEOC

PARAMETER DESCRIPTION

-----

P1 = SEGIDENTIFIER.(0:2) = SEG TYPE FIELD

= 0 => SEG IS A DATA SEGMENT

.(2:14) = DST ENTRY NUMBER

= 1 => SEG IS AN SL SEGMENT

.(2:14) = SL ENTRY NUMBER

= 2,3 => SEG IS PART OF A PROGRAM,

.(1:7) = PROGRAM INDEX

.(8:8) = LOGICAL SEGMENT NUMBER  
(0-255)

P2 = 0 (UNUSED)

P3 = 0 (UNUSED)

## EVENT 2

-----

EVENT NAME: SPECIALRO

DESCRIPTION: REQUEST OF SEGMENT EXPANSION/CONTRACTION, UNLOCK,  
UNFREEZE, IOUNFREEZE, LOCK, IOFREEZE, FREEZE

CALLING MODULE: KERNELC, KERNELD, ININ

CALLING PROCEDURES: UNLOCKSEG', IOFREEZE', FETCHSEGMENT-(KERNELC)  
DLSIZE, ZSIZE, GETPXSEG, ALTDSEGSIZE,  
ALTPXFILESIZE -(KERNELD)  
STACKOVERFLOW -(ININ)

### PARAMETER DESCRIPTION

-----

P1 = SEGIDENTIFIER.(0:2) = SEG TYPE FIELD

= 0 => SEG IS A DATA SEGMENT,  
          .(2:14) = DST ENTRY NUMBER  
=1 => SEG IS AN SL SEGMENT,  
          .(2:14) = SL ENTRY NUMBER  
=2,3 => SEG IS PART OF A PROGRAM,  
          .(1:7) = PROGRAM INDEX  
                  INTO CSTBLK  
          .(8:8) = LOGICAL SEGMENT  
                  NUMBER (0-255)

P2 = .(0:1) =1 => REQUEST IS THROUGH FETCHSEGMENT (TYPES  
                  0,1,2)

.(12:4) TYPE OF REQUEST

= 0=> IOFREEZE  
= 1=> FREEZE  
= 2=> LOCK  
= 3=> IOUNFREEZE  
= 4=> UNFREEZE  
= 5=> UNLOCK  
= 6=> DLSIZE EXPANSION  
= 7=> DLSIZE CONTRACTION  
= 8=> PXFIXED EXPANSION  
= 9=> PXFILE EXPANSION  
= 10=> PXFILE CONTRACTION  
= 11=> XDS EXPANSION  
= 12=> XDS CONTRACTION  
= 13=> ZSIZE EXPANSION  
= 14=> ZSIZE CONTRACTION  
= 15=> STACKOVERFLOW

P3 = FOR TYPES (P2.(12:4))

= 0,2,3,5 => P3.(8:8) = LOCK OR IOFREEZE COUNT  
= 1,4 => P3.(0:8) = FREEZE COUNT  
= 6-15 => REQUESTED SIZE OF AREA IN WORDS

EVENT 4

-----

EVENT NAME:  FETCHSEG

DESCRIPTION:  SEGMENT REQUEST (FOR I/O SYSTEM OR PROCESS)

CALLING MODULE:  KERNELC

CALLING PROCEDURE:  FETCHSEGMENT

PARAMETER DESCRIPTION

-----

P1 = SEGIDENTIFIER.(0:2) = SEG TYPE FIELD  
                          = 0  => SEG IS A DATA SEGMENT,  
                              .(2:14) = DST ENTRY NUMBER  
                          = 1  => SEG IS AN SL SEGMENT,  
                              .(2:14) = SL ENTRY NUMBER  
                          = 2,3=> SEG IS PART OF A PROGRAM,  
                              .(1:7) = PROGRAM INDEX  
                                      INTO CSTBLK  
                              .(8:8) = LOGICAL SEGMENT  
                                      NUMBER (0-255)

P2 = REQUESTORID  
      .(0:1) = 1  => I/O SYSTEM REQUEST  
                      .(8:8) = LDEV #  
      .(0:1) = 0  => PROCESS REQUEST  
                      .(8:8) = PIN # OF REQUESTING PROCESS  
      .(1:1) = 1  => IOFREEZE REQUEST  
      .(2:1) = 1  => BLOCKED LOCK REQUEST  
      .(3:1) = 1  => LOCK REQUEST  
      .(4:1) = 1  => FREEZE REQUEST

P3=  .(13:3)= 0  => SEGMENT ALREADY PRESENT  
                  = 1  => SEGMENT IS RECOVERABLE OVERLAY CANDIDATE  
                  = 2  => SEGMENT ALREADY ON ITS WAY IN FOR SOMEONE  
                  = 3  => SEGMENT NOT PRESENT -- MUST FETCH



EVENT 5

-----

EVENT NAME: SEGIOINIT

DESCRIPTION: MEMORY MANAGEMENT READ/WRITE OF SEGMENT FROM/TO  
DISC QUEUED

CALLING MODULE: KERNELC

CALLING PROCEDURES: PROCESSINITMSG, STARTSEGWRITE

PARAMETER DESCRIPTION

-----

P1 = SEGIDENTIFIER.(0:2) = SEG TYPE FIELD  
= 0 => SEG IS A DATA SEGMENT,  
 .(2:14) = DST ENTRY NUMBER  
= 1 => SEG IS AN SL SEGMENT,  
 .(2:14) = SL ENTRY NUMBER  
= 2,3 => SEG IS PART OF A PROGRAM,  
 .(1:7) = PROGRAM INDEX  
 INTO CSTBLK  
 .(8:8) = LOGICAL SEGMENT  
 NUMBER (0-255)  
P2 = DISCREQUEST INDEX - INDEX INTO THE DISC REQUEST TABLE  
 (SYSDB RELATIVE)  
P3 = .(0:1) = 1 => WRITE START  
 = 0 => READ START  
 .(2:15) = LDEV #

## EVENT 6

-----

EVENT NAME: SIODONE

DESCRIPTION: MEMORY MANAGEMENT SEGMENT READ/WRITE FROM/TO DISC  
COMPLETE

CALLING MODULE: KERNELC

CALLING PROCEDURES: SEGREADCOMPLETOR, SEGWRITECOMPLETOR

### PARAMETER DESCRIPTION

-----

P1 = SEGIDENTIFIER.(0:2) = SEG TYPE FIELD  
= 0 => SEG IS A DATA SEGMENT,  
      .(2:14) = DST ENTRY NUMBER  
= 1 => SEG IS AN SL SEGMENT,  
      .(2:14) = SL ENTRY NUMBER  
= 2,3=> SEG IS PART OF A PROGRAM,  
      .(1:7) = PROGRAM INDEX  
              INTO CSTBLK  
      .(8:8) = LOGICAL SEGMENT  
              NUMBER (0-255)  
P2 = DISCREQUEST INDEX - INDEX INTO THE DISC REQUEST TABLE  
      (SYSDB RELATIVE)  
P3 = .(0.1) = 1 => WRITE COMPLETE  
      = 0 => READ COMPLETE

EVENT 7 (%7)

-----

EVENT NAME: CGARBAGE

EVENT DESCRIPTION: GARBAGE COLLECTION HAS JUST TAKEN PLACE

CALLING MODULE: KERNELC

CALLING PROCEDURE: COLLECTGARBAGE

PARAMETER DESCRIPTION

-----

P1 = BANK OF SOURCE JUST MOVED FROM

P2 = ADDR OF SOURCE JUST MOVED FROM

P3 = MOVEPAGECNT, NUMBER OF PAGES JUST MOVED FROM

EVENT 8 (%10)

EVENT NAME: SWAPIN  
DESCRIPTION: SWAP IN A PROCESS

CALLING MODULE: KERNELC  
CALLING PROCEDURE: SWAPIN

PARAMETER DESCRIPTION

P1 = PIN OF PROCESS BEING SWAPPED IN  
P2 = .(0:1) = 0 => BEING SWAP  
              = 1 => END SWAP  
              .(1:1) = 0 => NORMAL (PARTIAL SWAP OK)  
                      = 1 => SWAP REQUIRED  
              .(12:4)= 0 => PROCESS SWAPIN COMPLETE  
                      2 => NO ROOM, HARD REQ MAY SUCCEED  
                      3 => NO ROOM, HARD REQ FAILED  
                      4 => SWAPIN STOPPED - MORE URGENT ACTIVITY  
                      8 => NO LOCK SPACE  
P3 = HARDREQUEST = TRUE => HARD REQUEST ON SWAPIN  
                  FALSE=> NORMAL

```

*
*
* MMSTAT EVENT GROUP 1
* MEMORY MANAGER
*

```

#### EVENT 12 (%14)

-----

EVENT NAME: ALLOCMEM  
 DESCRIPTION: FOUND A HOLE FOR A SEGMENT REPLACEMENT REQUEST  
 CALLING MODULE: KERNELC  
 CALLING PROCEDURE: RESERVEREGION

#### PARAMETER DESCRIPTION

-----

P1 = REQUESTED SIZE IN PAGES  
 P2 = BANK OF SELECTED REGION  
 P3 = ADDRESS OF SELECTED REGION

#### EVENT 13 (%15)

-----

EVENT NAME: DEALLOCM  
 DESCRIPTION: RELEASE REGION OF MEMORY TO AVAILABLE STATUS  
 CALLING MODULE: KERNELC  
 CALLING PROCEDURE: RELEASEREGION

#### PARAMETER DESCRIPTION

-----

P1 = SIZE RELEASED IN PAGES  
 P2 = BANK OF RELEASED REGION BASE  
 P3 = ADDRESS OF RELEASED REGION BASE

```

*
*
*
*
*
*

```

# MMSTAT EVENT GROUP 2

## EVENT -20 (-%24)

-----

EVENT NAME: ALCSTBLK

DESCRIPTION: REQUEST TO RESERVE A BLOCK OF ENTRIES IN THE CSTX

CALLING MODULE: KERNELD

CALLING PROCEDURE: ALCSTBLOCK

### PARAMETER DESCRIPTION

-----

|         |                                                                  |
|---------|------------------------------------------------------------------|
| P1=EIX  | CST BLOCK INDEX ASSIGNED                                         |
| P2=CSTX | DST RELATIVE INDEX OF WORD 0<br>OF THE FIRST RESERVED CSTX ENTRY |
| P3=N    | NUMBER OF CSTX ENTRIES RESERVED                                  |

## EVENT -21 (%25)

EVENT NAME: DEALCSTBLK

DESCRIPTION: INDICATES THAT A CST EXTENSION BLOCK HAS BEEN  
DEALLOCATED

CALLING MODULE: KERNELD

CALLING PROCEDURE: DEALCSTBLOCK

| PARAMETERS | PARAMETER DESCRIPTION                                                    |
|------------|--------------------------------------------------------------------------|
| P1=EIX     | CST BLOCK INDEX ASSIGNED<br>TO THE BLOCK OF CST ENTRIES                  |
| P2=CSTX    | DST RELATIVE INDEX OF WORD 0<br>OF THE FIRST CST ENTRY TO BE<br>RELEASED |
| P3=MCNT    | =(#ALLOCATED CSTX ENTRIES-<br>#ENTRIES BEING RELEASED)*4                 |

EVENT -23 (-%27)

EVENT NAME:RELRESOURCES

DESCRIPTION: RESOURCES (VDS,MAIN MEMORY, ST ENTRY) RESERVED FOR THE  
FOR THE SEGMENT HAVE BEEN RELEASED

CALLING MODULE: KERNELD

CALLING PROCEDURE: RELDATASEG

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|                      |  |
|----------------------|--|
| P1=NEW DB DST NUMBER |  |
|----------------------|--|

|                               |  |
|-------------------------------|--|
| P2=DELTA P AT EXCHANGEDB CALL |  |
|-------------------------------|--|

|                              |  |
|------------------------------|--|
| P3=STATUS AT EXCHANGEDB CALL |  |
|------------------------------|--|

\*\*\*\*\*  
\*  
\*  
\*                   MMMSTAT EVENT GROUP 3                   \*  
\*               (NOT CURRENTLY ASSIGNED)                   \*  
\*  
\*\*\*\*\*



```

*
*
* MMSTAT EVENT GROUP 4
* SCHEDULING
*

```

EVENT 40 (%50)

EVENT NAME: QUIESCE  
DESCRIPTION: PROCESS SWITCH - STATE OF PROCESS SAVED

CALLING MODULE: KERNELC  
CALLING PROCEDURE: DSP

PARAMETER DESCRIPTION

```

P1 = PCB00(CPCB)
.(0:1) = 1 => SAR - SCHEDULING ATTENTION REQUIRED
.(2:1) = 1 => CRIT - PROCESS IS CRITICAL
.(3:1) = 1 => HSIR - PROCESS HAS SIR
.(4:1) = 1 => PIOVR - PENDING PI, PROCESS CRITICAL
.(5:1) = 1 => HSPRI - HOLD SIR PRIORITY
.(6:1) = 1 => IPEXP - INCORE PROTECT EXPIRED
.(7:1) = 1 => PC - PREMPT CAPABILITY
.(8:1) = 1 => MP - MUST PREMPT
.(9:1) = 1 => LW - LONG WAIT
.(10:1)= 1 => SW - SHORT WAIT
.(11:1)= 1 => TRW - TERMINAL READ WAIT
.(12:1)=1 => USEQD - USED A QUANTUM SINCE TRANSACTION
 BEGAN
.(13:1)= 1 => HIPRI - HOLD IMPEDED PRIORITY
.(14:1)= 1 => ALLOW SOFT INTERRUPTS EVEN THOUGH IN
 SYSTEM CODE
.(15:1)= 1 => RITBK - PROCESS IN RIT BREAK

```

P2 = PCB04(CPCB)

|         |   |   |    |     |                                |
|---------|---|---|----|-----|--------------------------------|
| .(0:1)  | = | 1 | => | M   | - MOURNING WAIT                |
| .(1:1)  | = | 1 | => | RG  | - GLOBAL RIN WAIT              |
| .(2:1)  | = | 1 | => | RL  | - LOCAL RIN WAIT               |
| .(3:1)  | = | 1 | => | MA  | - MAIL WAIT                    |
| .(4:1)  | = | 1 | => | BIO | - BLOCKED IO WAIT              |
| .(5:1)  | = | 1 | => | IO  | - IO WAIT                      |
| .(6:1)  | = | 1 | => | UCP | - UCOP WAIT, RIT WAIT          |
| .(7:1)  | = | 1 | => | JNK | - JUNK WAIT                    |
| .(8:1)  | = | 1 | => | TIM | - TIMER WAIT                   |
| .(9:1)  | = | 1 | => | INT | - INTERRUPT WAIT               |
| .(10:1) | = | 1 | => | SON | - SON WAIT                     |
| .(11:1) | = | 1 | => | FA  | - FATHER WAIT                  |
| .(12:1) | = | 1 | => | IMP | - PROCESS WAITING TO UNIMPEDED |
| .(13:1) | = | 1 | => | SIR | - PROCESS WAITING FOR SIR      |
| .(14:1) | = | 1 | => | TIM | - PROCESS WAITING FOR TIME OUT |
| .(14:1) | = | 1 | => | MEM | - PROCESS WAITING FOR MEMORY   |

P3 = PCB13(CPCB)

|        |   |   |    |          |                                |
|--------|---|---|----|----------|--------------------------------|
| .(0:1) | = | 1 | => | DISPQ    | - PROCESS ON DISPATCHING QUEUE |
| .(1:1) | = | 1 | => | L        | SCHEDULING CLASS               |
| .(2:1) | = | 1 | => | C        | SCHEDULING CLASS               |
| .(3:1) | = | 1 | => | D        | SCHEDULING CLASS               |
| .(4:1) | = | 1 | => | E        | SCHEDULING CLASS               |
| .(5:1) | = | 1 | => | INTER-   | PROCESS IS INTERACTIVE         |
| .(6:1) | = | 1 | => | CORER-   | PROCESS IS CORE-RESIDENT       |
| .(8:8) | = |   |    | PROCESS' | SCHEDULING PRIORITY            |

```

*
*
*
* MMMSTAT EVENT GROUP 5
* (SEE CHAPTER 18 FOR THESE EVENTS)
*
*

```

```

*
* MMSTAT EVENT GROUP 6.
* FILESYS
* THESE EVENTS ARE FOR DEVELOPMENT USE ONLY
*

```

# EVENT -60(%74)

EVENT NAME: FOPEN  
DESCRIPTION: OLD FILE OPEN

CALLING MODULE: FILEACC

CALLING PROCEDURE: FOPENDA

| PARAMETERS              | PARAMETER DESCRIPTION                          |
|-------------------------|------------------------------------------------|
| P1= FILE #              | (0:2)=2 -> NON-SPOOLER ACCESS<br>(0:2).NE.2 -> |
| P2= AOPTIONS            | SEE INTRINSICS MANUAL                          |
| P3= FILE LABEL FOPTIONS | SEE INTRINSICS MANUAL                          |

# EVENT -61(%75)

EVENT NAME: FOPEN'  
DESCRIPTION: OLD DISC FILE OPEN (CONTINUATION OF EVENT -60)

CALLING MODULE: FILEACC

CALLING PROCEDURE: FOPENDA

| PARAMETERS                | PARAMETER DESCRIPTION |
|---------------------------|-----------------------|
| P1= RECORD SIZE           |                       |
| P2= FILE LABEL BLOCK SIZE |                       |
| P3= # OF BUFFERS          |                       |

EVENT -61(%75)

EVENT NAME: FOPEN'

DESCRIPTION: OLD FILE OPEN (CONTINUATION OF EVENTS -60 & -61)

CALLING MODULE: FILEACC

CALLING PROCEDURE: FOPENDA

| PARAMETERS                  | PARAMETER DESCRIPTION |
|-----------------------------|-----------------------|
| P1= FILE LABEL FILE LIMIT   | MSW                   |
| P2= FILE LABEL FILE LIMIT   | LSW                   |
| P3= FILE LABEL # OF EXTENTS |                       |

EVENT -60(%74)

EVENT NAME: FOPEN

DESCRIPTION: NEW DISC FILE OPEN

CALLING MODULE: FILEACC

CALLING PROCEDURE: FOPEN

| PARAMETERS   | PARAMETER DESCRIPTION                          |
|--------------|------------------------------------------------|
| P1= FILE #   | (0:2)=2 -> NON-SPOOLER ACCESS<br>(0:2).NE.2 -> |
| P2= AOPTIONS | SEE INTRINSICS MANUAL                          |
| P3= FOPTIONS | SEE INTRINICS MANUAL                           |

EVENT -61(%75)

EVENT NAME: FOPEN'

DESCRIPTION: NEW DISC FILE OPEN (CONTINUATION OF EVENT -60)

CALLING MODULE: FILEACC

CALLING PROCEDURE: FOPEN

| PARAMETERS       | PARAMETER DESCRIPTION |
|------------------|-----------------------|
| P1= RECORD SIZE  |                       |
| P2= BLOCK SIZE   |                       |
| P3= # OF BUFFERS |                       |

EVENT -61(%75)

EVENT NAME: FOPEN'

DESCRIPTION: NEW DISC FILE OPEN (CONTINUATION OF EVENT -60 & -61)

CALLING MODULE: FILEACC

CALLING PROCEDURE: FOPEN

| PARAMETERS                            | PARAMETER DESCRIPTION |
|---------------------------------------|-----------------------|
| P1= FCB FILE LIMIT                    |                       |
| P2= FCB MAX # EXTENTS                 |                       |
| P3= (0:8)= INITIAL ALLOCATION EXTENTS |                       |

EVENT -62(%76)

EVENT NAME: FREAD  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FREAD

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   | (0:1) BUFFER HIT FLAG |
| P2= ACBTLOG  | TRANSFER COUNT        |
| P3= NOT USED |                       |

EVENT -63(%77)

EVENT NAME: FWRITE  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FWRITE

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   | (0:1) BUFFER HIT FLAG |
| P2= TCOUNT   | SEE INTRINSIC MANUAL  |
| P3= NOT USED |                       |



EVENT -64(%100)

EVENT NAME: FREADDIR  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FREADDIR

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   | (0:1) BUFFER HIT FLAG |
| P2= ACBTLOG  | TRANSFER COUNT        |
| P3= NOT USED |                       |

EVENT -64(%100)

EVENT NAME: FREADDIR'  
DESCRIPTION: CONTINUATION OF EVENT -64 FREADDIR

CALLING MODULE: FILEIO

CALLING PROCEDURE: FREADDIR

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= REC #    | MSW                   |
| P2= REC #    | LSW                   |
| P3= NOT USED |                       |

EVENT -65(%101)

EVENT NAME: FWRITEDIR  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING MODULE: FWRITEDIR

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILENUM  | (0:1) BUFFER HIT FLAG |
| P2= TCOUNT   | SEE INTRINSIC MANUAL  |
| P3= NOT USED |                       |

EVENT -65(%101)

EVENT NAME: FWRITEDIR'  
DESCRIPTION: CONTINUATION OF EVENT -65 FWRITEDIR

CALLING MODULE: FILEIO

CALLING PROCEDURE: FWRITEDIR

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= REC #    | MSW                   |
| P2= REC #    | LSW                   |
| P3= NOT USED |                       |

EVENT -66(%102)

EVENT NAME: FUPDATE  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FUPDATE

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   | (0:1) BUFFER HIT FLAG |
| P2= TCOUNT   | SEE INTRINSIC MANUAL  |
| P3= NOT USED |                       |

EVENT -67(%103)

EVENT NAME: IOWAIT  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: IOWAIT

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   | (0:1) BUFFER HIT FLAG |
| P2= ACBTLOG  | TRANSFER COUNT        |
| P3= NOT USED |                       |

EVENT -68(%104)

EVENT NAME: FREADSEEK  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FREADSEEK

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1= FILE # | (0:1) BUFFER HIT FLAG |
| P2= REC #  | MSW                   |
| P3= REC #  | LSW                   |

EVENT -69(%105)

EVENT NAME: FSPACE  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FSPACE

| PARAMETERS       | PARAMETER DESCRIPTION |
|------------------|-----------------------|
| P1= FILE #       |                       |
| P2= DISPLACEMENT | SEE INTRINSIC MANUAL  |
| P3= NOT USED     |                       |

```

*
* MMSTAT EVENT GROUP 7
* FILESYS
* THESE EVENTS ARE FOR DEVELOPMENT USE ONLY
*

```

# EVENT -70(%106)

EVENT NAME: FPOINT  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FPOINT

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1= FILE # |                       |
| P2= REC #  | MSW                   |
| P3= LSW    | LSW                   |

# EVENT -71(%107)

EVENT NAME: FCONTROL  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FCONTROL

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   |                       |
| P2= CODE     | SEE INTRINSIC MANUAL  |
| P3= NOT USED |                       |

EVENT -72(%110)

EVENT NAME: FSETMODE  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FSETMODE

| PARAMETERS    | PARAMETER DESCRIPTION |
|---------------|-----------------------|
| P1= FILE #    |                       |
| P2= MODEFLAGS | SEE INTRINSIC MANUAL  |
| P3=           |                       |

EVENT -74(%112)

EVENT NAME: FCHECK  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FCHECK

| PARAMETERS    | PARAMETER DESCRIPTION |
|---------------|-----------------------|
| P1= FILE #    |                       |
| P2= ERRORCODE | SEE INTRINSIC MANUAL  |
| P3= 0         |                       |

EVENT -75(%113)

EVENT NAME: FGETINFO  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FGETINFO

| PARAMETERS   | PARAMETER DESCRIPTION |
|--------------|-----------------------|
| P1= FILE #   |                       |
| P2= FOPTIONS | SEE INTRINSIC MANUAL  |
| P3= AOPTIONS | SEE INTRINSIC MANUAL  |

EVENT -76(%114)

EVENT NAME: FREADLABEL  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE:

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1= FILE # |                       |
| P2= TCOUNT | SEE INTRINSIC MANUAL  |
| P3= 0      |                       |

EVENT -77(%115)

EVENT NAME: FWRITELABEL  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FWRITELABEL

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1= FILE # |                       |
| P2= TCOUNT | SEE INTRINSIC MANUAL  |
| P3= 0      |                       |

EVENT -78(%116)

EVENT NAME: FLOCK  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FLOCK

| PARAMETERS    | PARAMETER DESCRIPTION |
|---------------|-----------------------|
| P1= FILE #    |                       |
| P2= LOCKCOND  | SEE INTRINSIC MANUAL  |
| P3= COND CODE | SEE INTRINSSIC MANUAL |



EVENT -79(%117)

EVENT NAME: FUNLOCK  
DESCRIPTION:

CALLING MODULE: FILEIO

CALLING PROCEDURE: FUNLOCK

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|            |  |
|------------|--|
| P1= FILE # |  |
|------------|--|

|       |  |
|-------|--|
| P2= 0 |  |
|-------|--|

|       |  |
|-------|--|
| P3= 0 |  |
|-------|--|

```

*
* MMSTAT EVENT GROUP 8
*
* THESE EVENTS ARE FOR DEVELOPMENT USE ONLY
*

```

# EVENT -80(%120)

EVENT NAME: FRENAME  
DESCRIPTION:

CALLING MODULE: FILEACC

CALLING PROCEDURE: FRENAME

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|            |  |
|------------|--|
| P1= FILE # |  |
|------------|--|

|       |  |
|-------|--|
| P2= 0 |  |
|-------|--|

|       |  |
|-------|--|
| P3= 0 |  |
|-------|--|

# EVENT -81(%121)

EVENT NAME: FCLOSE  
DESCRIPTION:

CALLING MODULE: FILEACC

CALLING PROCEDURE: FCLOSE

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|            |  |
|------------|--|
| P1= FILE # |  |
|------------|--|

|          |                      |
|----------|----------------------|
| P2= DISP | SEE INTRINSIC MANUAL |
|----------|----------------------|

|             |                    |
|-------------|--------------------|
| P3= SECCODE | SEE INTRINSIC CODE |
|-------------|--------------------|

```

*
* MMSTAT EVENT GROUP 9
*
* DISC I/O TRANSFER REQUESTS
* THESE EVENTS ARE FOR DEVELOPMENT USE ONLY

```

EVENT -98(%142)

EVENT NAME: DISK TRAFFIC  
DESCRIPTION: DISC I/O REQUEST HAS BEEN QUEUED

CALLING MODULE: HARDRES

CALLING PROCEDURE: ATTACHIO

| PARAMETERS     | PARAMETER DESCRIPTION                                                                  |
|----------------|----------------------------------------------------------------------------------------|
| P1=CNT         | DATA TRANSFER COUNT:WORDS IF >0;<br>BYTES IF <0                                        |
| P2=FLAGS.(0:4) |                                                                                        |
| P3=FNCT        | =0 ==>READ<br>=1 ==>WRITE<br>=2 ==>OPEN FILE<br>=3 ==>CLOSE FILE<br>=4 ==>CLOSE DEVICE |

```

*
*
* MMSTAT EVENT GROUP 10
*
*

```

EVENT 100(%144)

EVENT NAME: DISK ERROR  
DESCRIPTION: RECORD DISC ERROR

CALLING MODULE: IOFDISC1

CALLING PROCEDURE: FHDDVR

| PARAMETERS                                 | PARAMETER DESCRIPTION |
|--------------------------------------------|-----------------------|
| P1=DIPT(DSTAT)                             | HARDWARE STATUS       |
| P2=S0                                      | QMISC                 |
| P3=IOQP(QLDEV).QLDEVN LOR STOCOUNT&LSL(8)) |                       |
| =LDEV/SIO PROGRAM COUNTER                  |                       |

EVENT 101(%145)

EVENT NAME: DISK ERROR  
DESCRIPTION: RECORD DISC ERROR

CALLING MODULE: IOMDISCO

CALLING PROCEDURE: MHDDVR

| PARAMETERS                                 | PARAMETER DESCRIPTION |
|--------------------------------------------|-----------------------|
| P1=DIPT(DSTAT)                             | HARDWARE STATUS       |
| P2=S0                                      | QMISC                 |
| P3=IOQP(QLDEV).QLDEVN LOR STOCOUNT&LSL(8)) |                       |
| =LDEV/SIO PROGRAM COUNTER                  |                       |

```

*
*
* MMSTAT EVENT GROUP 11
*
*

```

EVENT -110(%156)

EVENT NAME: START I/O

DESCRIPTION: DRIVER INITIATOR FOR SIO DEVICE HAS BEEN CALLED

CALLING MODULE: HARDRES

CALLING PROCEDURE: SIODM

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|                                                 |  |
|-------------------------------------------------|--|
| P1=IOQPL(QSTAT) LOR IOQPL(QLDEV).LDEVN          |  |
| = (0:8) PCB ENTRY # OF PROCESS MAKING REQUEST   |  |
| (8:8) LOGICAL DEVICE NUMBER OF DEVICE FOR I/O   |  |
| P2=IOQP(QWBCT)=WORD COUNT IF>0; BYTE COUNT IF<0 |  |
| P3=(0:2) = FUNCTION CODE SPECIFIED BY DRIVER    |  |

|     |            |
|-----|------------|
| = 0 | => READ    |
| = 1 | => WRITE   |
| = 2 | => CONTROL |

= (6:10) = DSTN OF TARGET DATA SEG

EVENT -111(%157)

EVENT NAME: I/O COMPLETION

DESCRIPTION: SIO COMPLETION

CALLING MODULE: HARDRES

CALLING PROCEDURE: SIODM

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|                                               |                           |
|-----------------------------------------------|---------------------------|
| P1=IOQP(QLDEV).LDEVN=LOGICAL DEVICE NUMBER OF |                           |
|                                               | DISC INVOLVED IN TRANSFER |
| P2=IOQP(QPAR1)                                | (DEFINED BY DRIVER)       |
| P3=IOQP(QPAR2)                                | (DEFINED BY DRIVER)       |

```

*
*
* MMSTAT EVENT GROUP 12
*
*

```

EVENT -120(%170)

EVENT NAME: DISKSPACE  
DESCRIPTION: BUG CATCHER

CALLING MODULE: ALLOCATE

CALLING PROCEDURE: DISKSPACE

| PARAMETERS                            | PARAMETER DESCRIPTION          |
|---------------------------------------|--------------------------------|
| P1=PDISKADR<0 ==>                     | GET DISC SPACE AT THIS ADDRESS |
| =0 ==>                                | GET N SECTORS ON ANY DISC      |
| >0 ==>                                | RETURN SPACE                   |
| P2=SECOND WORD OF PDISKADR            |                                |
| P3=LDEV=LOGICAL DEVICE NUMBER OF DISC |                                |

EVENT -121(%171)

EVENT NAME: DISKSPACE  
DESCRIPTION: BUG CATCHER

CALLING MODULE: ALLOCATE

CALLING PROCEDURE: DISKSPACE

| PARAMETERS         | PARAMETER DESCRIPTION        |
|--------------------|------------------------------|
| P1=NSECT           | NUMBER OF SECTORS REQUESTED  |
| P2=WORD 2 OF NSECT |                              |
| P3=RETURNVAL       | =0==> OK                     |
|                    | =1 ==> I/O ERROR             |
|                    | =2 ==> INVALID NSECT         |
|                    | =3 ==> SPACE NOT AVAILABLE   |
|                    | =4 ==> INVALID DISC ADDRESS  |
|                    | =5 ==> FREE SPACE TABLE FULL |

EVENT 125 (%175)

-----

EVENT NAME: IOBUFTRP

EVENT DESCRIPTION: IOSYSTEM BUFFER TRAP

CALLING MODULE: HARDRES

CALLING PROCEDURE: SIODM

PARAMETER DESCRIPTION

-----

P1 = IOQP

P2 = IOQP(QDSTN).DSTN = DST NUMBER OF BUFFER

P3 = 0

```

*
*
* MMSTAT EVENT GROUP 13
*
* (NOT USED)
*

```

```

*
*
* MMSTAT EVENT GROUP 14
*
* CS/3000
*

```

EVENT 140 (%214)

EVENT NAME: COPEN  
DESCRIPTION:

CALLING MODULE: COMSYS2

CALLING PROCEDURE: COPEN

| PARAMETERS                    | PARAMETER DESCRIPTION |
|-------------------------------|-----------------------|
| P1 (0:8) = CS ERROR CODE      |                       |
| (8:8) = LOGICAL DEVICE NUMBER |                       |
| P2 PMAP1                      |                       |
| P3 PMAP2                      |                       |



EVENT 142 (%216)

EVENT NAME: CABORTIO  
DESCRIPTION:

CALLING MODULE: COMSYS1

CALLING PROCEDURE: CABORTIO

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|    |                |
|----|----------------|
| P1 | LOGICAL DEVICE |
|----|----------------|

|    |          |
|----|----------|
| P2 | IOQINDEX |
|----|----------|

|    |   |
|----|---|
| P3 | 0 |
|----|---|

EVENT 144 (%220)

EVENT NAME: CSIOWAIT  
DESCRIPTION:

CALLING MODULE: COMSYS1

CALLING PROCEDURE: CSIOWAIT

| PARAMETERS | PARAMETER DESCRIPTION                                  |
|------------|--------------------------------------------------------|
| P1         | (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |
| P2         | TRANSMISSION LOG                                       |
| P3         |                                                        |

EVENT 146 (%222)

EVENT NAME: CCLOSE  
DESCRIPTION:

CALLING MODULE: COMSYS3

CALLING PROCEDURE: CCLOSE

| PARAMETERS | PARAMETER DESCRIPTION                                  |
|------------|--------------------------------------------------------|
| P1         | (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |
| P2         | LINE NUMBER                                            |
| P3         | 0                                                      |

EVENT 147 (%223)

EVENT NAME: CREAD  
DESCRIPTION:

CALLING MODULE: COMSYS4

CALLING PROCEDURE: CREAD

| PARAMETERS                                                | PARAMETER DESCRIPTION |
|-----------------------------------------------------------|-----------------------|
| P1 (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |                       |
| P2 INCOUNT                                                |                       |
| P3 STATION                                                |                       |

EVENT 149 (%225)

EVENT NAME: CWRITE  
DESCRIPTION:

CALLING MODULE: COMSYS4

CALLING PROCEDURE: CWRITE

| PARAMETERS                                                | PARAMETER DESCRIPTION |
|-----------------------------------------------------------|-----------------------|
| P1 (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |                       |
| P2 OUTCOUNT                                               |                       |
| P3 INCOUNT                                                |                       |

```

*
*
* MMSTAT EVENT GROUP 15
*
* CS/3000

```

# EVENT 150 (%226)

EVENT NAME: CSDRIVER  
DESCRIPTION:

CALLING MODULE: BSCLCM

CALLING PROCEDURE: CSDRIVER

| PARAMETERS      | PARAMETER DESCRIPTION                                                                        |
|-----------------|----------------------------------------------------------------------------------------------|
| P1 TIMER LSW    |                                                                                              |
| P2 CURRENTSTATE | WHERE THE DRIVER IS IN THE<br>STATE TRANSITION TABLE                                         |
| P3 CURRENTEVENT | (0:8) = CURRENT EVENT<br>(8:8) = LOGICAL DEVICE<br>WHAT CAUSED THE DRIVER TO BECOM<br>ACTIVE |

# EVENT 152 (%230)

EVENT NAME: CCONTROL  
DESCRIPTION

CALLING MODULE: COMSYS5

CALLING PROCEDURE: CCONTROL

| PARAMETERS                                                | PARAMETER DESCRIPTION |
|-----------------------------------------------------------|-----------------------|
| P1 (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |                       |
| P2 CONTROL CODE                                           |                       |
| P3 PARAMETER                                              |                       |

EVENT 153 (%231)

EVENT NAME: COPENTRACEFILE  
DESCRIPTION:

CALLING MODULE:

CALLING PROCEDURE: COPENTRACEFILE

| PARAMETERS | PARAMETER DESCRIPTION                                  |
|------------|--------------------------------------------------------|
| P1         | (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |
| P2         | CTRACEINFO                                             |
| P3         | 0                                                      |

EVENT-154 (%232)

EVENT NAME: CCLOSETRACEFILE  
DESCRIPTION:

CALLING MODULE:

CALLING PROCEDURE: CCLOSETRACEFILE

| PARAMETERS | PARAMETER DESCRIPTION                                  |
|------------|--------------------------------------------------------|
| P1         | (0:8) = CS ERROR CODE<br>(8:8) = LOGICAL DEVICE NUMBER |
| P2         | 0                                                      |
| P3         | 0                                                      |

EVENT 155 (%233)

EVENT NAME: CPOLLIST  
DESCRIPTION:

CALLING MODULE:

CALLING PROCEDURE: CPOLLIST

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|    |                |
|----|----------------|
| P1 | LOGICAL DEVICE |
|----|----------------|

|    |               |
|----|---------------|
| P2 | CS ERROR CODE |
|----|---------------|

|    |      |
|----|------|
| P3 | PMAP |
|----|------|

```

*
*
*
*
*
*

```

MMSTAT EVENT GROUP 16

EVENT 160(%240)

EVENT NAME: CREAD  
DESCRIPTION:

CALLING MODULE: DSMON

CALLING PROCEDURE:

PARAMETERS            PARAMETER DESCRIPTION

P1= TIME STAMP

P2= (0:4) NOT USED  
       (4:1) BLOCK  
       (5:2) STATE  
       (7:3) NEXT  
       (10:1) :=0   INITIALIZATION EVENT  
               :=1   COMPLETION EVENT  
       (11:5) SUB EVENT NUMBER

P3= DEPENDS ON THE SUB EVENT NUMBER AND  
       IF ITS A INITIALIZATION OR COMPLETION EVENT.  
       MSG: (0:4)   STRMTYPX  
             (4:6)   MSG CLS  
             (10:16) STRMTYP

| SUB<br>EVENT NO. | SUB EVENT<br>NAME | INIT<br>PARM | COMP<br>PARM |
|------------------|-------------------|--------------|--------------|
| 0                | CREAD             | 0            | LEN          |
| 1                | CWRITE            | X MSG        | LEN          |
| 2                | IOWAIT            | 0            | LEN          |
| 3                | CHECK             | 0            | ERRCOD       |
| 4                | DSATTN            | 0            | 0            |
| 5                | DSWC              | X MSG        | R MSG        |
| 6                | CHNGEWAIT         | PARM         | 0            |
| 7                | MONREQ            | REQ          | 0            |
| 10               | CABORT            | 0            | T/F          |
| 11               | CRESET            | 0            | 0            |
| 12               | CSDATA            | R MSG        |              |
| 13               | CSREREAD          |              |              |

```

*
*
* MMSTAT EVENT GROUP 19
*
*
*

```

EVENT 191(%277)

EVENT NAME: DISKINTRPT

DESCRIPTION: A 7905/7920 CONTROLLER IS PROCESSING AN ATTENTION INTERRUPT  
(ONLINE/OFFLINE)

CALLING MODULE: HARDRES

CALLING PROCEDURE: SIODM

| PARAMETERS | PARAMETER DESCRIPTION                |
|------------|--------------------------------------|
| P1= @DITP  | (US)--ie.WHO GOT THE INTERRUPT       |
| P2= @DITP  | (THEM)--ie. WHO RAN THE POLL PROGRAM |
| P3= DITP   | "OUR" DIT FLAGS WORD                 |

THERE SHOULD BE AT LEAST AN %300 AND AN %303 FOR EACH SIO PRGM.  
A SINGLE ISOLATED (IN TIME) REQUEST WILL GENERATE AT LEAST A  
%303, %300, %303. IF THE QUEUE OF IOQE'S ON A DIT NEVER EMPTIES  
THERE WOULD BE ONE %300 AND ONE %303 PER SIO PRGM.



EVENT 192(%300)

EVENT NAME: GIPINTERUPT

DESCRIPTION: INTERRUPT JUST PROCESSED

CALLING MODULE: HARDRES

CALLING PROCEDURE: GIP

| PARAMETERS                 | PARAMETER DESCRIPTION                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| P1= (0:7)                  | LDEV note a) its easy to read in oct<br>b) ldevs > 127 will<br>be recorded mod 128                                               |
| (8:9)                      | ADDRESS CONTAINED IN DRT WORD 0 RE-<br>LATIVE TO SIO PROGRAM AREA (ie where<br>did it stop?)<br>ABS(DRTN*4)-(ILTP(ISIOP)+SYSDB)) |
| P2= DEVICE STATUS          | (the TIO GIP just did)                                                                                                           |
| P3= LSW of a call to TIMER |                                                                                                                                  |

EVENT 195(%303)

EVENT NAME: SIODM

DESCRIPTION: LEAVING SIODM

CALLING MODULE: CRIO

CALLING PROCEDURE: SIODM

| PARAMETERS                 | PARAMETER DESCRIPTION                                                                                                                                                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P1= (0:7) LDEV             | -- SAME AS 192(%300)                                                                                                                                                                                                                                                             |
| (8:9)                      | a IOQ table relative index<br>to convert this into the number that<br>is formatted by DPAN2, multiply this num<br>ber by %13 and add %10, that will be the<br>number in the left column of returned<br>IOQ'S-- add the table base to get the<br>DPAN number for "in-use" enries. |
| P2= DIT WORD 0 (DIT FLAGS) | -- note that P2.(12:4)<br>contains the state we are "leaving"                                                                                                                                                                                                                    |
| P3= (0:4)                  | THE CONTENTS OF DIT0.(12:4)<br>ie, the state we entered in                                                                                                                                                                                                                       |
| (4:12) LSW OF TIMER        | -- note the difference<br>between P3 of %300 and<br>P3 of %303, these 12 bit<br>will hold ~4.1 seconds w<br>is enough for 30229 con-<br>trollers purpose and DS<br>timeouts (some types).                                                                                        |

```

*
*
* MMSTAT EVENT GROUP 20
*
* THESE EVENTS ARE FOR DEVELOPMENT USE ONLY
*

```

#### EVENT 200(%310)

EVENT NAME: DISKBUGCATCHER  
DESCRIPTION:

CALLING MODULE: PVSYS

CALLING PROCEDURE: MVTABLE

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|           |  |
|-----------|--|
| P1= FUNCT |  |
|-----------|--|

|            |  |
|------------|--|
| P2= MVTABX |  |
|------------|--|

|            |  |
|------------|--|
| P3= DELTAP |  |
|------------|--|

#### EVENT 201(%311)

EVENT NAME: DISKBUGCATCHER  
DESCRIPTION:

CALLING MODULE: PVSYS

CALLING PROCEDURE: USERTABLE

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|           |  |
|-----------|--|
| P1= FUNCT |  |
|-----------|--|

|            |  |
|------------|--|
| P2= MVTABX |  |
|------------|--|

|            |  |
|------------|--|
| P3= DELTAP |  |
|------------|--|

```

*
*
* MMSTAT EVENT GROUP 21
* PROCESS CREATIONS AND TERMINATIONS
* LOGICAL PROCESS TABLE
*

```

EVENT -211(%323)

EVENT NAME: PROCESS COMPLETION  
 DESCRIPTION: PROCESS HAS TERMINATED

CALLING MODULE: MORGUE

CALLING PROCEDURE: TERMINATE

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1=0       |                       |
| P2=0       |                       |
| P3=0       |                       |

```

*
*
* MMSTAT EVENT GROUP 22
*
* TIME STAMP OF EVENT TRACE ENABLE AND DISABLE

```

EVENT 221(%335)

EVENT NAME: CONFIGURATION INFORMATION  
DESCRIPTION: EVENT GROUP MASK

CALLING MODULE: CRIO

CALLING PROCEDURE: CONSMON

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|              |  |
|--------------|--|
| P1= MEASMSKO |  |
|--------------|--|

|              |  |
|--------------|--|
| P2= MEASMSK1 |  |
|--------------|--|

|     |  |
|-----|--|
| P3= |  |
|-----|--|

EVENT 222(%336)

EVENT NAME: CONFIGURATION INFORMATION

DESCRIPTION: MPE VERSION FIX UPDATE

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|             |  |
|-------------|--|
| P1= VERSION |  |
|-------------|--|

|          |  |
|----------|--|
| P2= FIXL |  |
|----------|--|

|            |  |
|------------|--|
| P3= UPDATL |  |
|------------|--|

EVENT -223 (-%337)

EVENT NAME: CONFIGURATION INFORMATION

DESCRIPTION: SYSTEM TABLE LOCATIONS AND AVAILABLE LINKED MEMORY  
INFORMATION

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

|                             |                       |
|-----------------------------|-----------------------|
| P1=F(%1032)=@CST(0)-@DST(0) | =DISPLACEMENT TO CODE |
|-----------------------------|-----------------------|

|                                |                           |
|--------------------------------|---------------------------|
| P2=F(%1033)=@CST(LAST)-@DST(0) | =DISPLACEMENT TO SHARABLE |
|--------------------------------|---------------------------|

|                                              |  |
|----------------------------------------------|--|
| P3=LOGICAL(TOTAL&DLSK(4))=LINKED MEMORY SIZE |  |
|----------------------------------------------|--|

EVENT -224 -(340)

EVENT NAME: SYSPINS  
DESCRIPTION: LOGICAL PROCESS TABLE

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS         | PARAMETER DESCRIPTION     |
|--------------------|---------------------------|
| P1=ABSOLUTE(%1141) | =PROGEN'S PCBENTRY NUMBER |
| P2=ABSOLUTE(%1142) | =MAM'S PCB ENTRY NUMBER   |
| P3=ABSOLUTE(%1143) | =UCOP'S PCB ENTRY NUMBER  |

EVENT -225 -(341)

EVENT NAME: SYSPINS(CNTD.)  
DESCRIPTION: LOGICAL PROCESS TABLE

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS         | PARAMETER DESCRIPTION     |
|--------------------|---------------------------|
| P1=ABSOLUTE(%1144) | =PFAIL'S PCB ENTRY NUMBER |
| P2=ABSOLUTE(%1145) | =DEVREC'S PCB ENTRY #     |
| P3=ABSOLUTE(%1146) | =PRMSG'S PCB ENTRY #      |

EVENT -226 -(342)

EVENT NAME: SYSPINS(CNTD.)  
DESCRIPTION: LOGICAL PROCESS TABLE

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS         | PARAMETER DESCRIPTION |
|--------------------|-----------------------|
| P1=ABSOLUTE(%1147) | =STMSG'S PCB ENTRY #  |
| P2=ABSOLUTE(%1150) | =LOG'S PCB ENTRY #    |
| P3=ABSOLUTE(%1151) | =LOAD'S PCB ENTRY #   |

EVENT -227 (-%343)

EVENT NAME: SYSPINS(CNTD.)  
DESCRIPTION: LOGICAL PROCESS TABLE

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS         | PARAMETER DESCRIPTION     |
|--------------------|---------------------------|
| P1=ABSOLUTE(%1152) | =IOMESSPROC'S PCB ENTRY # |
| P2=ABSOLUTE(%1153) | =SYSIOPROC'S PCB ENTRY #  |
| P3=ABSOLUTE(%1154) | =MEMLOGP'S PCB ENTRY #    |

EVENT -228 (%344)

EVENT NAME: TIMESTAMP  
DESCRIPTION: TIMESTAMP

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS       | PARAMETER DESCRIPTION                                |
|------------------|------------------------------------------------------|
| P1=CALENDER      | (0:7)=YEAR OF CENTURY<br>(7:9)=DAY OF YEAR           |
| P2=CLOCK(WORD1). | (0:7)=HOUR OF DAY<br>(8:8)=MINUTE OF HOUR            |
| P3=CLOCK(WORD2). | (0:7)=SECONDS INTO MINUTE<br>(8:8)=TENTHS OF SECONDS |

EVENT -229 (-%345)

EVENT NAME: MONOFF  
DESCRIPTION: END EVENT TRACING

CALLING MODULE: OPCOMMAND

CALLING PROCEDURE: CXMON

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1=0       |                       |
| P2=0       |                       |
| P3=0       |                       |



```

*
*
* MMSTAT EVENT GROUP 23
* TERMINAL I/O
*

```

EVENT 230 (%346)  
-----

EVENT NAME: TERMREAD  
DESCRIPTION: TERMINAL READ COMPLETION

CALLING MODULE: HARDRES  
CALLING PROCEDURE: TIP

| PARAMETERS         | PARAMETER DESCRIPTION |
|--------------------|-----------------------|
| P1 = LDEV          |                       |
| P2 = READ DURATION |                       |
| P3 = BYTES READ    |                       |

EVENT 231 (%347)  
-----

EVENT NAME: DC1DC2ACK  
DESCRIPTION: DC1/DC2 HAS BEEN SATISFIED

CALLING MODULE: HARDRES  
CALLING PROCEDURE: TIP

| PARAMETERS                            | PARAMETER DESCRIPTION |
|---------------------------------------|-----------------------|
| P1 = LDEV                             |                       |
| P2 = DURATION (BETWEEN START AND DC2) |                       |
| P3 = BYTES READ (EXCLUDING DC2)       |                       |

EVENT 232 (%350)

-----

EVENT NAME: TERMWRITE

DESCRIPTION: WRITE COMPLETION

CALLING MODULE: IOTERM0

CALLING PROCEDURE: TERMION

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

P1 = LDEV

P2 = 0

P3 = BYTE COUNT OF TRANSFER

EVENT 233 (%351)

-----

EVENT NAME: BINREAD

DESCRIPTION: BINARY READ COMPLETED

CALLING MODULE: HARDRES

CALLING PROCEDURE: TIP

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
|------------|-----------------------|

P1 = LDEV

P2 = DURATION

P3 = BYTES READ

EVENT 234 (%352)  
-----

EVENT NAME: TERMLOGON  
DESCRIPTION: TERMINAL JUST LOGGING ON

CALLING MODULE: IOTERMO  
CALLING PROCEDURE: TERMIOM

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1 = LDEV  |                       |
| P2 = 0     |                       |
| P3 = 0     |                       |

EVENT 235 (%353)  
-----

EVENT NAME: TERMLOGOFF  
DESCRIPTION: TERMINAL JUST LOGGED OFF

CALLING MODULE: IOTERMO  
CALLING PROCEDURE: TERMIOM

| PARAMETERS | PARAMETER DESCRIPTION |
|------------|-----------------------|
| P1 = LDEV  |                       |
| P2 = 0     |                       |
| P3 = 0     |                       |

EVENT 236 (%354)

-----

EVENT NAME: SPECCHAR

DESCRIPTION: PROCESSED SPECIAL CHARACTER

CALLING MODULE: HARDRES

CALLING PROCEDURE: TIP

| PARAMETERS                        | PARAMETER DESCRIPTION |
|-----------------------------------|-----------------------|
| P1 = LDEV                         |                       |
| P2 = SPECIAL CHARACTGER PROCESSED |                       |
| P3 = 0                            |                       |

EVENT 237 (%355)

-----

EVENT NAME: BREAK

DESCRIPTION: PROCESSED BREAK

CALLING MODULE: HARDRESS

CALLING PROCEDURE: TIP

| PARAMETERS  | PARAMETER DESCRIPTION |
|-------------|-----------------------|
| P1 = LDEV   |                       |
| P2 = DSTATE |                       |
| P3 = 0      |                       |

EVENT 238 (%356)

-----

EVENT NAME: SPECREAD

DESCRIPTION: SPECIAL READ TERMINATION CHARACTER DETECTED

CALLING MODULE: HARDRES

CALLING PROCEDURE: TIP

PARAMETERS

PARAMETER DESCRIPTION

P1 = LDEV

P2 = DURATION

P3 = BCNT

## READER COMMENT SHEET

### MPE IV System Tables Reference Manual

32002-90003

Apr 1981

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Is this manual technically accurate?

Yes ☐ No ☐ (If no, explain under Comments, below.)

Are the concepts and wording easy to understand?

Yes ☐ No ☐ (If no, explain under Comments, below.)

Is the format of this manual convenient in size, arrangement, and readability?

Yes ☐ No ☐ (If no, explain or suggest improvements under Comments, below.)

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---

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